DEPARTMENT OF THE INTERIOR
Ray Lyman Wilbur, Secretary

U. S. GEOLOGICAL SURVEY
George Otis Smith, Director

BULLETIN 809

FORMULAS AND TABLES

FOR THE

CONSTRUCTION OF POLYCONIC PROJECTIONS

COMPILED BY
C. H. BIRDSEYE

UNITED STATES
GOVERNMENT PRINTING OFFICE
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PREFACE

The primary purpose of this publication is to provide tables for the construction of polyconic projections of topographic maps of standard quadrangles without any interpolation. Bulletin 650, "Geographic tables and formulas," gives many of the data needed, but the projection tables in that bulletin are incomplete, and many of them require difficult interpolation. The tables given herewith have been prepared with arguments for each meridian and parallel represented on maps of standard quadrangles, and the data are given in inches for each of the standard field scales employed by the Geological Survey. Tables in the same form have also been prepared for the two scales on which most of the quadrangle maps of the Geological Survey are published in final form—1:62,500, 1:125,000—and also for the scales 1:63,360, 1:20,000, 1:12,000, and 1:10,000. On account of lack of funds for printing, these tables have not been included in this publication, but it is hoped that they can be published at a later date.

A secondary purpose is to present in one publication all of the theory of the polyconic projection, with the formulas developed in detail and their use so explained that the engineer or cartographer with only an average knowledge of mathematics can understand and use them. Complete instructions are given for making polyconic projections of standard quadrangles by means of these tables.

The theory of the modified polyconic projection of the international map of the world is also explained, and tables for its construction are given with the data in meters on the natural scale as well as in inches on the scale of 1 : 1,000,000. For the first time these data have been computed for each degree of latitude.

The tables have been computed by members of the computing section of the United States Geological Survey, under the supervision of George T. Hawkins. The author is indebted to David H. Baldwin and Edward W. Tibbott, of the Geological Survey, and to Oscar Adams, of the United States Coast and Geodetic Survey, for valuable advice and critical review. Notices of errors and suggestions for improvement of the material are invited.

C. H. Birdseye,
Chief Topographic Engineer.

FORMULAS AND TABLES FOR THE CONSTRUCTION OF POLYCONIC PROJECTIONS

Compiled by C. H. Birdseye

GENERAL CONSIDERATIONS

Choice of a projection.—In mapping large areas the engineer is confronted with the problem of representing accurately on the plane surface of a map the details that exist on the earth's spherical surface. As it is impossible to do this exactly, he must resort to the use of some convention that will represent the earth's surface with the least distortion. The systematic drawing on a plane surface of lines that represent reference lines on the spherical surface of the earth is called a map projection. There are many systems of projection, each of which fulfills certain desirable conditions but none of which is ideal. The choice of the proper projection to use for a certain map is not always easy but depends largely on the extent of the area to be represented and on the use to which the map will be put. The best treatise on map projection published in English is United States Coast and Geodetic Survey Special Publication 68, "Elements of map projection."

Advantages and disadvantages of the polyconic projection.—The topographic engineer needs a projection which is simple in construction, which can be used to represent small areas on any part of the globe, and which, for each small area to which it is applied, preserves shapes, areas, distances, and azimuths in their true relation to the surface of the earth. For areas of small extent the polyconic projection meets all these needs, and it was adopted for the standard topographic map of the United States, in which the 1° quadrangle is the largest unit and the 15′ quadrangle is the average unit. Misuse of this projection in attempts to spread it over large areas—that is, to construct a single map of a large area—has developed serious errors and gross exaggeration of details. For example, the polyconic projection is not at all suitable for a single-sheet map of the United States or of a large State, although it has been so employed. Its greatest advantage lies in the facts that it has been computed for all latitudes of the entire spheroid and that it represents a small area on any part of the earth's surface just as well as one on any other part.

Characteristics of the polyconic projection.—The polyconic projection takes its name from the fact that it is based on the development of a large number of cones each conceived to be tangent to the spheroid at a parallel of latitude to be represented on the map. It has been computed for every minute of latitude from 0° to 90°, and existing tables make its construction very easy. It was devised by Ferdinand Hassler, the first superintendent of the United States Coast and Geodetic Survey, and has been computed by that bureau. The theory of the projection and tables for its construction are given in Coast and Geodetic Survey Special Publications 57 and 5.

In this projection a central meridian is drawn as a straight line, and the intersections of the parallels are spaced true to scale along this central meridian. Each parallel is then laid down separately by means of a cone whose base is tangent to the earth's surface at that parallel, with the vertex of the developed cone on the extension of the central meridian. The arcs of the parallels thus drawn are subdivided to true scale, and the meridians are drawn through these subdivisions. As a result the central meridian is shown as a straight line, and theoretically all other meridians are shown as curves. As the meridians and parallels nowhere intersect at right angles, except along the central meridian, and as all the other meridians are drawn as curves concave toward the central meridian, it is theoretically impossible to fit together in a row, east and west, two maps each of which is developed on its own central meridian, as their joining edges are curved in opposite directions. However, in practice and within certain limits this theoretical condition does not exist. It is impossible for a draftsman or an engraver to draw the limiting meridians of a 1° or smaller quadrangle within the latitudinal limits of the United States other than as straight lines. Moreover, as the projection is extended from the central meridian the length of the meridians is theoretically increased, but even in latitude 60° the difference in length between the line representing the limiting meridian of a 1° quadrangle and the line representing the central meridian is too small to be plotted, and the lengths of all the meridians on a projection of 1° or smaller may be assumed to be the same. Therefore, a row of maps east and west will join perfectly, although as the north edge of each map is shorter than the south edge the row will form a curve. A tier of maps north and south will also join with sufficient accuracy. Theoretically, there will be small gores between the edges of each east-west row of maps and the next row to the north or south, but in actual practice the distortion of map paper due to changes in atmospheric conditions is greater than the error of joining, so that by slightly stretching the outer tiers a moderate number of maps—say five or six each way—can be joined with approximately perfect accuracy. Seldom, if ever, will a map user

wish to join more than five or six quadrangle maps in any direction. The limits in the size of tables or wall space make further extension impracticable, and therefore the theoretical weaknesses of this projection can be ignored so far as maps of small quadrangles are concerned.

THEORY OF THE AMERICAN POLYCONIC PROJECTION

Clarke's spheroid.—The data in the following tables for the polyconic projection of maps are based on the dimensions of the spheroid determined by Col. A. R. Clarke, R. E., in 1866, as expressed by Clarke in meters but not as expressed by him in feet. Although the International Geophysical Union has adopted the Hayford spheroid as the most exactly determined representation of the size and shape of the earth, and the dimensions of the Hayford spheroid are now used in geophysical research, still the Clarke spheroid represents very closely the true size and shape of the earth, and most of the existing tables for the projection of maps are based on it. In the following tables the data are merely converted from measurements on the spheroid in meters, given in United States Coast and Geodetic Survey Special Publication 5, to inches on the several map scales employed by the United States Geological Survey. Some interpolation has been required in order to provide data for arguments for use in the construction of standard projections of 7½′ and 15′ quadrangles, such as latitude and longitude intervals of 1¼′, 2½′, 3¾′, and 7½′. Interpolation has also been employed in the conversion of the data, which may have resulted in errors of 0.001 inch in the tables, but one one-thousandth of an inch can not be plotted.

Tables are given for all the standard field scales employed by the Geological Survey for latitudes 0° to 51° or more. As the computation of special projections may be required, the fundamental formulas and demonstrations of their development are given with instructions for their use. The nomenclature employed in the formulas given in different publications on this subject differs, and in some demonstrations of the development of the formulas there may be some doubt as to the meaning of the symbols employed and some confusion in the use of mathematical expressions, such as an arc expressed in terms of the radius. An attempt has therefore been made to explain fully the meaning of each symbol or expression and to make the demonstrations and the instructions as to the use of the formulas so clear that a cartographer with only average knowledge of mathematics can follow them. In these demonstrations the following publications have been consulted freely and to some extent are quoted verbatim: United States Coast and Geodetic Survey Special Publications 5 and 57, Smithsonian Geographic Tables, and United States Geological Survey Bulletins 50 and 650.

Clarke expressed the dimensions of the spheroid in meters and also in English feet. According to him 1 meter = 39.370432 inches = 3.28086933 feet. The Smithsonian Geographic Tables and United States Geological Survey Bulletin 50, both prepared by R. S. Woodward, depend on the Clarke spheroid as expressed by him in feet. Some of the tables given in United States Geological Survey Bulletin 650 are extracts from the Smithsonian Geographic Tables and some are extracts from the United States Coast and Geodetic Survey tables. The polyconic projection tables computed by the United States Coast and Geodetic Survey depend on the dimensions of the spheroid as expressed by Clarke in meters, and the tables given herein depend on these dimensions and on the legal value in the United States of 1 meter = 39.37 inches = 3.28083333 feet. This figure does not express the absolutely correct relation between the international meter and the inch, but it is close enough for all practical purposes of map projection. Therefore, in order to reduce the dimensions of the spheroid as given by Clarke and Woodward in feet, and any tables of length based thereon, to corresponding values given in the United States Coast and Geodetic Survey Tables and those in this publication, it is necessary to multiply by the fraction $\frac{39.37}{39.370432} = 0.99998903$ (log. 9.99999523–10).

Constants of the generating ellipse.—The constants of the generating ellipse of a spheroid for which values are required in the computation of projection tables are defined as follows:

a = semimajor axis.
b = semiminor axis.
e = eccentricity.

$$n = \frac{a-b}{a+b} = \frac{1-\sqrt{1-e^2}}{1+\sqrt{1-e^2}}$$

The values of these constants with their logarithms for the Clarke spheroid of 1866 expressed in meters as used in computing the tables in this publication are:

a = 6,378,206.4 meters.	$\log a$ = 6.8046985690.
b = 6,356,583.8 meters.	$\log b$ = 6.8032237768.
e^2 = 0.0067686580.	$\log e^2$ = 7.8305025710–10.
n = 0.0016979157.	$\log n$ = 7.2299161198–10.

Radii of curvature.—The principal radii of curvature of an ellipsoid (see fig. 1) are

ρ_m = the radius of curvature of a meridional section.
ρ_n = the radius of curvature of a section normal to the meridian.

Both are constant for a given latitude, but for precise computations infinitely small sections of the circumference of the meridional ellipse must be considered, because meridional arcs cover a range of latitude,

and therefore ρ_m must be evaluated for infinitely small changes in latitude.

In Figure 1, let APP′D represent a quadrant of the generating ellipse; AQQ′B, a quadrant of the circumscribed circle; EFF′D, a quadrant of the inscribed circle; P and P′, two contiguous points on the ellipse at the ends of the infinitely small arc ds; PK and P′K ($=\rho_m$), the normals at P and P′, or the radius of curvature of the infinitely small meridional arc ds; PK′ ($=\rho_n$), the radius of curvature of a section normal to the meridian; OA ($=a$), the semimajor axis; OD ($=b$), the semiminor axis; the angle $XRP=\phi$, the latitude of the point P; and the angle $XOQ=\psi$, the geocentric latitude of the point P.

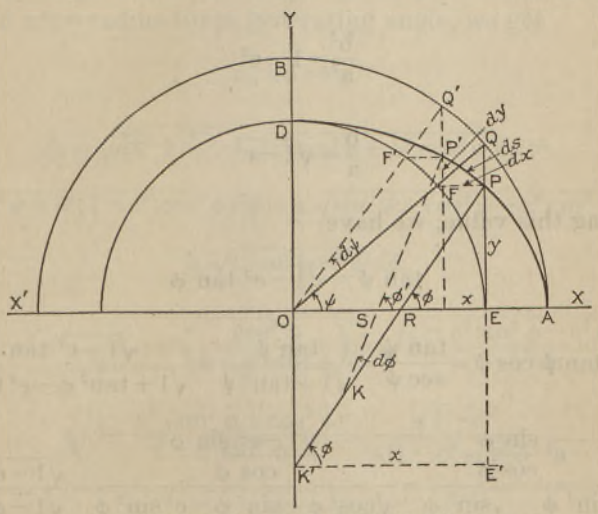

FIGURE 1.—Elements of generating ellipse

Expressing the coordinates of the point P in parametric form, we have

$$x=a\cos\psi$$

$$y=b\sin\psi$$

As the point moves from P to P′ the small changes in x and y are PF ($=-dx$) and FP′ ($=dy$), respectively. If the two equations are differentiated, ψ being regarded as a variable angle and x and y as functions of ψ, then

$$dx=-a\sin\psi\,d\psi$$

$$dy=\quad b\cos\psi\,d\psi$$

The triangles RPE and PP′F are similar and the angle PP′F = angle PRE $=\phi$, therefore

$$\tan\phi=\frac{-dx}{dy}.$$

Substituting the values of dx and dy, we have

$$\tan \phi = \frac{a \sin \psi}{b \cos \psi} = \frac{a}{b} \tan \psi$$

or

$$\tan \psi = \frac{b}{a} \tan \phi$$

The eccentricity of the ellipse, represented by e, is defined by the equation

$$e^2 = \frac{a^2 - b^2}{a^2} = 1 - \frac{b^2}{a^2}$$

or

$$\frac{b^2}{a^2} = 1 - e^2$$

and

$$\frac{b}{a} = \sqrt{1 - e^2}$$

Substituting this value, we have

$$\tan \psi = \sqrt{1 - e^2} \tan \phi$$

but

$$\sin \psi = \tan \psi \cos \psi = \frac{\tan \psi}{\sec \psi} = \frac{\tan \psi}{\sqrt{1 + \tan^2 \psi}} = \frac{\sqrt{1 - e^2} \tan \phi}{\sqrt{1 + \tan^2 \phi - e^2 \tan^2 \phi}} =$$

$$\frac{\sqrt{1 - e^2} \dfrac{\sin \phi}{\cos \phi}}{\sqrt{1 + \dfrac{\sin^2 \phi}{\cos^2 \phi} - e^2 \dfrac{\sin^2 \phi}{\cos^2 \phi}}} = \frac{\dfrac{\sqrt{1 - e^2} \sin \phi}{\cos \phi}}{\dfrac{\sqrt{\cos^2 \phi + \sin^2 \phi - e^2 \sin^2 \phi}}{\cos \phi}} = \frac{\sqrt{1 - e^2} \sin \phi}{\sqrt{1 - e^2 \sin^2 \phi}}$$

and

$$\cos \psi = \frac{\sin \psi}{\tan \psi} = \frac{1}{\sqrt{1 + \tan^2 \psi}} = \frac{1}{\sqrt{1 + \tan^2 \phi - e^2 \tan^2 \phi}} =$$

$$\frac{1}{\sqrt{1 + \dfrac{\sin^2 \phi}{\cos^2 \phi} - e^2 \dfrac{\sin^2 \phi}{\cos^2 \phi}}} = \frac{1}{\dfrac{\sqrt{\cos^2 \phi + \sin^2 \phi - e^2 \sin^2 \phi}}{\cos \phi}} = \frac{\cos \phi}{\sqrt{1 - e^2 \sin^2 \phi}}$$

Using the fundamental differential formula $d \tan x = \sec^2 x \, dx$, we have

$$\sec^2 \psi \, d\psi = d \tan \psi$$

Substituting the value of $\tan \psi$ and differentiating, we have

$$\sec^2 \psi \, d\psi = \sqrt{1 - e^2} \sec^2 \phi \, d\phi$$

or

$$d\psi = \frac{\sqrt{1-e^2}\sec^2\phi\, d\phi}{\sec^2\psi} = \sqrt{1-e^2}\sec^2\phi\, d\phi\cos^2\psi = \frac{\cos^2\phi\sqrt{1-e^2}\sec^2\phi\, d\phi}{1-e^2\sin^2\phi} =$$

$$\frac{\sqrt{1-e^2}\, d\phi}{1-e^2\sin^2\phi}$$

Let ds denote the infinitely small meridional arc PP′ of the generating ellipse; $\rho_m = PK$, the radius of curvature of the small arc; and $d\phi$ the angle PKP′, expressed in circular measure, through which the end of the radius moves in generating the small arc. Then considering the infinitely small arc of the ellipse as an arc of a circle and using the relation arc = radius times generating angle, we get

$$\rho_m\, d\phi = ds.$$

But

$$ds = \sqrt{\overline{dx}^2 + \overline{dy}^2} = \sqrt{a^2\sin^2\psi + b^2\cos^2\psi}\, d\psi =$$

$$\sqrt{a^2\sin^2\psi + a^2(1-e^2)\cos^2\psi}\, d\psi = a\sqrt{\sin^2\psi + \cos^2\psi - e^2\cos^2\psi}\, d\psi =$$

$$a\sqrt{1-e^2\cos^2\psi}\, d\psi$$

also

$$\sqrt{1-e^2\cos^2\psi} = \sqrt{1-e^2\left(\frac{\cos^2\phi}{1-e^2\sin^2\phi}\right)} = \sqrt{\frac{1-e^2\sin^2\phi - e^2\cos^2\phi}{1-e^2\sin^2\phi}} =$$

$$\sqrt{\frac{1-e^2(\sin^2\phi+\cos^2\phi)}{1-e^2\sin^2\phi}} = \frac{\sqrt{1-e^2}}{\sqrt{1-e^2\sin^2\phi}}$$

and

$$d\psi = \frac{\sqrt{1-e^2}\, d\phi}{1-e^2\sin^2\phi}$$

therefore

$$\sqrt{1-e^2\cos^2\psi}\, d\psi = \frac{(1-e^2)\, d\phi}{(1-e^2\sin^2\phi)^{\frac{3}{2}}}$$

and

$$ds = \frac{a(1-e^2)\, d\phi}{(1-e^2\sin^2\phi)^{\frac{3}{2}}}$$

but

$$\rho_m = \frac{ds}{d\phi}$$

therefore

$$\rho_m = \frac{a(1-e^2)}{(1-e^2\sin^2\phi)^{\frac{3}{2}}} \text{ ----------[I]}$$

If we pass a plane through any point P on the ellipsoid, parallel to the equatorial plane of the ellipsoid, this plane intersects the ellipsoid in a circle which represents the parallel at the point P, and the normals to the surface of the ellipsoid at every point on this

parallel circle intersect in a point K′ on the minor axis of the ellipsoid. If we pass a plane through the normals of any two contiguous points on the parallel circle and then let these normals approach each other until they coincide, we obtain a plane tangent to the given parallel and perpendicular to the meridian at the point of tangency. The radius of curvature in this plane corresponding to a small arc of the parallel is represented by PK′, because the normals of each point on the arc intersect at K′. If we denote this radius by ρ_n we have in the triangle PK′E′,

$$\cos \phi = \frac{x}{\rho_n}$$

Hence

$$\rho_n = \frac{x}{\cos \phi} = \frac{a \cos \psi}{\cos \phi} = \frac{\frac{a \cos \phi}{\sqrt{1-e^2 \sin^2 \phi}}}{\cos \phi} = \frac{a}{(1-e^2 \sin^2 \phi)^{\frac{1}{2}}} \text{------[II]}$$

It is evident that ρ_n is always greater than ρ_m except when $\phi = \pm 90°$; in that event $\rho_n = \rho_m$.

Logarithms of ρ_m and ρ_n in English feet are given in the Smithsonian Geographic Tables for each minute from 0° to 90° and in Geological Survey Bulletin 50 for each minute from 21° to 51°; to reduce these logarithms to logarithms of the radii expressed in American feet to correspond to the relation with the legal value of the meter in the United States, 47.7 in the last (7th) place must be subtracted. To reduce logarithms of American feet to logarithms of meters (United States legal value) the logarithm 9.48401583–10 should be added. Consequently the logarithms given in the Smithsonian Geographic Tables or in Geological Survey Bulletin 50 may be used for computations of formulas and tables given in the present publication by adding the logarithm 9.48401106–10.

However, in connection with geodetic computations the Coast and Geodetic Survey has adopted several factors based on the Clarke spheroid as expressed in meters (United States legal value), and it is more convenient to use two of these factors, log A and log B, than to use the values of ρ_m and ρ_n given in the Smithsonian Geographic Tables. The logarithms of these factors have been computed to the seventh place for each minute from 0° to 72° and are given in Geological Survey Bulletin 650 and in Coast and Geodetic Survey Special Publication 8. These factors are

$$A = \frac{(1-e^2 \sin^2 \phi)^{\frac{1}{2}}}{a \text{ arc } 1''}$$

$$B = \frac{(1-e^2 \sin^2 \phi)^{\frac{1}{2}}}{a(1-e^2) \text{ arc } 1''}$$

Introducing these factors into the formulas for ρ_m and ρ_n given above, we have

$$\rho_m = \frac{1}{B \text{ arc } 1''} \text{ ---------- [III]}$$

$$\rho_n = \frac{1}{A \text{ arc } 1''} \text{ ---------- [IV]}$$

In these factors arc 1″ is expressed in radians [1] and is 0.0000048481368 log arc 1″=4.6855748668–10, which is the same as log sin 1″ to the tenth decimal place.

Meridional arcs.—The length of an arc of a circle equals the length of its radius times the length of the arc expressed in radians. If a very short section of a meridional ellipse is considered as an arc of a circle, the length of this short section can be found by the use of simple formulas with sufficient exactness for use in ordinary large-scale map projections. But if it is desired to find the length of a long arc or to determine exactly the length of a short arc, it is necessary to take the summation of the lengths of the infinitely small arcs making up the arc whose length is desired, by the process of integrating between the limiting parallels the variable lengths of the small arcs corresponding to infinitely small uniform subdivisions of the difference of latitude.

The length of a short meridional arc lying between two given parallels of latitude can be computed by the simple formulas given below, in which

ϕ_1 and ϕ_2 are the latitudes, expressed in degrees, minutes, and seconds, of the ends of the arc.

$\phi = \frac{1}{2}(\phi_1 + \phi_2)$ and is the mean latitude of the arc.

$\Delta\phi = \phi_2 - \phi_1$ and is here taken as the length of the arc expressed in radians.

$\Delta\phi' = \phi_2 - \phi$ and is here taken as the length of the arc expressed in minutes.

Arc 1′=0.0002908882 radian, or the length of an arc of 1′ for a unit radius.

ΔM is the required length of the arc, or the meridional distance expressed in meters. Then, as the length of the arc equals the length of the radius times the arc expressed in radians,

$$\Delta M = \rho_m \Delta\phi = \rho_m \text{ arc } 1' \ \Delta\phi'$$

But.

$$\rho_m = \frac{1}{B \text{ arc } 1''}$$

[1] A radian is an arc of a circle equal to its radius and is a unit arc in circular measure. Its value in degrees is $\frac{360}{2\pi}$, which equals 57°.29577951 or 3437′.746771 or 206264″.80625.

therefore

$$\Delta M = \frac{\text{arc } 1''\Delta\phi'}{\text{arc } 1''B} = \frac{60\Delta\phi'}{B} \text{ ---------- [V]}$$

Log 60 = 1.7781513. Log B for the mean latitude ϕ is given for each minute of latitude in Table 28, Geological Survey Bulletin 650, and in Coast and Geodetic Survey Special Publication 8. The approximate formula for ΔM should not be used for arcs of the meridian longer than 1°. The error will depend on the latitude but for 1° will be approximately +0.8 meter, for 30′ about +0.4 meter, for 15′ about +0.2 meter, and for 7½′ about +0.1 meter. The latitude, the scale, and the size of the projection will control largely the selection of formulas.

For the computation of the length of a long meridional arc or the precise computation of a short arc, a formula must be used which will give the sum of the varying lengths corresponding to infinitely small subdivisions of the difference of latitude. In other words, the approximate formula $\Delta M = \rho_m \Delta\phi$ must be integrated between the limits of the latitudes of the ends of the arc. The expression will be integrated first in general form between latitude 0° and any latitude ϕ.

$d\phi$ = an infinitely small difference in latitude, or the differential of the latitude.

M = the length of the arc in meters, from the Equator to latitude ϕ. Using the value of ρ_m given in [I], we have

$$M = \int_0^{\phi} \frac{a(1-e^2)\, d\phi}{(1-e^2 \sin^2\phi)^{\frac{3}{2}}}$$

Expanding the binomial reciprocal of the denominator, we have

$$(1-e^2 \sin^2\phi)^{-\frac{3}{2}} = 1 + \frac{3}{2}e^2 \sin^2\phi + \frac{15}{8}e^4 \sin^4\phi + \frac{35}{16}e^6 \sin^6\phi + \frac{315}{128}e^8 \sin^8\phi + \cdots\cdots$$

But,

$$\sin^2\phi = \frac{1}{2}(1-\cos 2\phi) = \frac{1}{2} - \frac{1}{2}\cos 2\phi$$

$$\sin^4\phi = \frac{3}{8} - \frac{1}{2}\cos 2\phi + \frac{1}{8}\cos 4\phi$$

$$\sin^6\phi = \frac{5}{16} - \frac{15}{32}\cos 2\phi + \frac{3}{16}\cos 4\phi - \frac{1}{32}\cos 6\phi$$

$$\sin^8\phi = \frac{35}{128} - \frac{7}{16}\cos 2\phi + \frac{7}{32}\cos 4\phi - \frac{1}{16}\cos 6\phi + \frac{1}{128}\cos 8\phi$$

Substituting these values and arranging the terms as constants and as coefficients of cos 2ϕ, cos 4ϕ, etc., we have

$$(1-e^2\sin^2\phi)^{-\frac{1}{2}}=\overbrace{\left(1+\frac{3}{4}e^2+\frac{45}{64}e^4+\frac{175}{256}e^6+\frac{11025}{16384}e^8+\cdots\right)}^{A}$$

$$-\overbrace{\left(\frac{3}{4}e^2+\frac{15}{16}e^4+\frac{525}{512}e^6+\frac{2205}{2048}e^8+\cdots\right)}^{B}\cos 2\phi$$

$$+\overbrace{\left(\frac{15}{64}e^4+\frac{105}{256}e^6+\frac{2205}{4096}e^8+\cdots\right)}^{C}\cos 4\phi$$

$$-\overbrace{\left(\frac{315}{512}e^6+\frac{315}{2048}e^8+\cdots\right)}^{D}\cos 6\phi$$

$$+\overbrace{\left(\frac{315}{16384}e^8+\cdots\right)}^{E}\cos 8\phi$$

$$-(\cdot\cdot\cdot\cdot\cdot)$$

Then

$$M=\int_0^{\phi} a(1-e^2)[A-B\cos 2\phi+C\cos 4\phi-D\cos 6\phi+E\cos 8\phi-\cdots\cdot]\,d\phi$$

But

$$\int m\,dx=mx+k \text{ and } \int m\cos nx\,dx=\frac{m}{n}\sin nx+k$$

fundamental formulas in which
m is a definite coefficient
x is a variable quantity
n is a coefficient of the variable
k is a constant.

Therefore

$$\int a(1-e^2)\,A\,d\phi=a(1-e^2)\,A\phi+k$$

$$\int a(1-e^2)\,B\cos 2\phi\,d\phi=a(1-e^2)\,B\frac{1}{2}\sin 2\phi+k$$

$$\int a(1-e^2)\,C\cos 4\phi\,d\phi=a(1-e^2)\,C\frac{1}{4}\sin 4\phi+k$$

$$\int a(1-e^2)\,D\cos 6\phi\,d\phi=a(1-e^2)\,D\frac{1}{6}\sin 6\phi+k$$

$$\int a(1-e^2)\,E\cos 8\phi\,d\phi=a(1-e^2)\,E\frac{1}{8}\sin 8\phi+k.$$

The value of M between the limits 0° and ϕ° is the difference between the integrals when $\phi=\phi°$ and when $\phi=0°$. If $\phi=0°$, then sin 2ϕ, sin 4ϕ, etc., $=0$, and the integral of each of the five terms given above is equal to k. In the subtraction of integrals all the k's cancel. Therefore,

$$M=a(1-e^2)\left[A\phi-\frac{1}{2}B\sin 2\phi+\frac{1}{4}C\sin 4\phi-\frac{1}{6}D\sin 6\phi+\frac{1}{8}E\sin 8\phi-\cdots\right]$$

Substituting the values of A, B, C, D, and E, we get

$$\begin{aligned}M=a(1-e^2)\Bigg[&\left(1+\frac{3}{4}e^2+\frac{45}{64}e^4+\frac{175}{256}e^6+\frac{11025}{16384}e^8+\cdots\right)\phi\\&-\frac{1}{2}\left(\frac{3}{4}e^2+\frac{15}{16}e^4+\frac{525}{512}e^6+\frac{2205}{2048}e^8+\cdots\right)\sin 2\phi\\&+\frac{1}{4}\left(\frac{15}{64}e^4+\frac{105}{256}e^6+\frac{2205}{4096}e^8+\cdots\right)\sin 4\phi\\&-\frac{1}{6}\left(\frac{35}{512}e^6+\frac{315}{2048}e^8+\cdots\right)\sin 6\phi\\&+\frac{1}{8}\left(\frac{315}{16384}e^8+\cdots\right)\sin 8\phi\\&-\cdots\cdots\Bigg]\end{aligned}$$

Let

$$A_0=a(1-e^2)\left(1+\frac{3}{4}e^2+\frac{45}{64}e^4+\frac{175}{256}e^6+\frac{11025}{16384}e^8+\cdots\right)$$
$$=6{,}367{,}399.6891 \text{ meters.}$$

$$A_2=a(1-e^2)\left(\frac{3}{4}e^2+\frac{15}{16}e^4+\frac{525}{512}e^6+\frac{2205}{2048}e^8+\cdots\right)$$
$$=32{,}433.8882 \text{ meters.}$$

$$A_4=\frac{1}{2}a(1-e^2)\left(\frac{15}{64}e^4+\frac{105}{256}e^6+\frac{2205}{4096}e^8+\cdots\right)=34.4187 \text{ meters.}$$

$$A_6=\frac{1}{3}a(1-e^2)\left(\frac{35}{512}e^6+\frac{315}{2048}e^8+\cdots\right)=0.0454 \text{ meters.}$$

$$A_8=\frac{1}{4}a(1-e^2)\left(\frac{315}{16384}e^8+\cdots\right)=0.00006 \text{ meters.}$$

Then

$$M=A_0\phi-\frac{1}{2}A_2\sin 2\phi+\frac{1}{2}A_4\sin 4\phi-\frac{1}{2}A_6\sin 6\phi+\frac{1}{2}A_8\sin 8\phi-\cdots \quad [VI]$$

This expression, in which ϕ is expressed in radians, gives the length of the arc of the meridian (in meters, if a is taken in meters) from the

Equator to the parallel at latitude ϕ. The length of the arc of the meridian represented by the difference between two values of ϕ is found by taking the difference in the values of M for the two latitudes.

Let M_2 = length of the arc of the meridian from the Equator to latitude ϕ_2.

M_1 = length of the arc of the meridian from the Equator to latitude ϕ_1.

$\Delta M = M_2 - M_1$ = length of the arc between latitudes ϕ_1 and ϕ_2.

$\phi = \frac{1}{2}(\phi_2 + \phi_1)$ = mean latitude of the arc.

$\Delta\phi = \phi_2 - \phi_1$

Then

$$\Delta M = A_0(\phi_2 - \phi_1) - \frac{1}{2}A_2(\sin 2\phi_2 - \sin 2\phi_1) + \frac{1}{2}A_4(\sin 4\phi_2 - \sin 4\phi_1$$

$$-\frac{1}{2}A_6(\sin 6\phi_2 - \sin 6\phi_1) + \frac{1}{2}A_8(\sin 8\phi_2 - \sin 8\phi_1) - \cdots\cdots$$

But

$$\sin\alpha - \sin\beta = 2\cos\frac{1}{2}(\alpha+\beta)\sin\frac{1}{2}(\alpha-\beta)$$

Substituting

$2\phi_2$, $4\phi_2$, etc., for α and $2\phi_1$, $4\phi_1$, etc., for β, we have

$$\Delta M = A_0(\phi_2 - \phi_1) - \frac{1}{2}A_2\left[2\cos\frac{1}{2}(2\phi_2+2\phi_1)\sin\frac{1}{2}(2\phi_2-2\phi_1)\right]$$

$$+\frac{1}{2}A_4\left[2\cos\frac{1}{2}(4\phi_2+4\phi_1)\sin\frac{1}{2}(4\phi_2-4\phi_1)\right]$$

$$-\frac{1}{2}A_6\left[2\cos\frac{1}{2}(6\phi_2+6\phi_1)\sin\frac{1}{2}(6\phi_2-6\phi_1)\right]$$

$$+\frac{1}{2}A_8\left[2\cos\frac{1}{2}(8\phi_2+8\phi_1)\sin\frac{1}{2}(8\phi_2-8\phi_1)\right]$$

But

$$\frac{1}{2}(2\phi_2+2\phi_1) = 2\phi, \quad \frac{1}{2}(4\phi_2+4\phi_1) = 4\phi, \text{ etc.}$$

and

$$\frac{1}{2}(2\phi_2-2\phi_1) = \Delta\phi, \quad \frac{1}{2}(4\phi_2-4\phi_1) = 2\Delta\phi, \text{ etc.}$$

therefore

$$\Delta M = A_0\Delta\phi - A_2\cos 2\phi\sin\Delta\phi + A_4\cos 4\phi\sin 2\Delta\phi$$
$$-A_6\cos 6\phi\sin 3\Delta\phi + A_8\cos 8\phi\sin 4\Delta\phi - \cdots\cdots \quad \text{[VII]}$$

In the first term of the formula given above, $\Delta\phi$ is expressed in radians, and the value of A_0 is 6,367,399.6891 meters. If it is desired to use

the formula with $\Delta\phi$ expressed in degrees, minutes, or seconds, values of A_0 must be taken as follows:

$$A^\circ_0 = \frac{2\pi}{360} A_0 = 111{,}132.0894 \text{ meters} \qquad \log = 5.0458394793$$

$$A'_0 = \frac{2\pi}{21600} A_0 = 1{,}852.2015 \text{ meters} \qquad \log = 3.2676882316$$

$$A''_0 = \frac{2\pi}{1296000} A_0 = 30.8700 \text{ meters} \qquad \log = 1.4895366$$

In computing lengths of arcs of the meridian for the projection tables given in this publication, in which the arcs are taken in terms of minutes, the following formula should be used, the last term containing A_8 being dropped:

$$\Delta M = 1{,}852.2015\Delta\phi' - 32{,}433.8882 \cos 2\phi \sin \Delta\phi + 34.4187 \cos 4\phi \sin 2\Delta\phi$$
$$- 0.0454 \cos 6\phi \sin 3\Delta\phi + \cdots \text{---------- [VIII]}$$

$$\log\ 1{,}852.2015 = 3.2676882316$$
$$32{,}433.8882 = 4.5109990154$$
$$34.4187 = 1.5367944629$$
$$0.0454 = 8.6570559 - 10$$

Arcs of the parallel.—For computations of the length of the arc of the parallel lying between two given meridians of longitude the formulas given below may be used, in which—

ϕ is the latitude of the parallel, expressed in degrees, minutes, and seconds.

r is the length of the radius of the parallel, expressed in meters.

ρ_n is the length of the radius of curvature of the section normal to the meridian, expressed in meters.

λ_1 and λ_2 are the longitudes of the ends of the arc, expressed in degrees, minutes, and seconds.

$\Delta\lambda = \lambda_2 - \lambda_1$ and is the arc of the parallel expressed in degrees or minutes or seconds, the unit depending on the formula used. If fractional parts of degrees or minutes or seconds are required they must be expressed decimally.

ΔP is the required length of the arc expressed in meters.

The radius of any parallel is equal to the product of the radius of curvature of the normal section for the same latitude by the cosine of that latitude, as is seen in Figure 2 in the triangle PK′M, in which $\cos \phi = \frac{r}{\rho_n}$. Therefore

$$r = \rho_n \cos \phi$$

and the entire length of the parallel is

$$2\pi r = 2\pi \rho_n \cos \phi$$

Any arc of the parallel is equal to the entire length of the parallel divided by the number of units in the circumference and multiplied by the number of the same units in the arc. Therefore

$$\Delta P = \frac{2\pi\rho_n \cos\phi}{360} \ (\Delta\lambda \text{ in degrees})$$

But

$$\rho_n = \frac{1}{A \text{ arc } 1''}$$

therefore

$$\Delta P = \left(\frac{2\pi}{360 \text{ arc } 1''}\right)\left(\frac{\cos\phi}{A}\right)(\Delta\lambda \text{ in degrees})$$

$$= \left(\frac{20\pi}{\text{arc } 1^\circ}\right)\left(\frac{\cos\phi}{A}\right)(\Delta\lambda \text{ in degrees})$$

But

$$\text{arc } 1^\circ = \frac{\pi}{180} \cdot \text{ and } \frac{20\pi}{\text{arc } 1^\circ} = \frac{20\pi}{\frac{\pi}{180}} = 3600$$

therefore

$$\left.\begin{aligned} \Delta P \text{ (meters)} &= 3600 \frac{\cos\phi}{A} \ \Delta\lambda \text{ (degrees)} \\ &= 60 \frac{\cos\phi}{A} \Delta\lambda \text{ (minutes)} \\ &= \frac{\cos\phi}{A} \Delta\lambda \text{ (seconds)} \end{aligned}\right\} \text{---------[IX]}$$

Rectangular coordinates.—In the polyconic system of map projection each parallel of latitude represented on the map appears as the developed circumference of the base of a right cone tangent to the spheroid along that parallel. Thus the parallel PN (fig. 2) and the arc P_1P_2 (fig. 3) will appear in projection as the arc of a circle PP_1P_2N (fig. 4) whose radius $GP_1 = l$ is equal to the slant height of the tangent cone PGN (fig. 2).

In constructing a map projection on this system the meridians and parallels are usually delineated by plotting and joining their points of intersection. The coordinates of these points may be expressed in the following manner (see figs. 3 and 4): For any parallel, as PP_1P_2N, take the origin P_1 at the intersection with the central meridian and let the rectangular axes of $Y(P_1G)$ and of $X(P_1Q)$ be respectively coincident with and perpendicular to this meridian.

Let $\Delta\lambda$ represent the difference of longitude between the central meridian and the next adjacent one; $\Delta P = P_1P_2$ the arc of the parallel between the central meridian and the next adjacent one; θ the angle

at the apex of the developed tangent cone between the central meridian and the next adjacent one; ϕ the latitude of the parallel, which is also the angle at the apex of the tangent cone between a meridional element of the surface of the cone and its axis; l the slant height of the tangent cone and the radius of the developed parallel; r the radius of the parallel in the plane of the parallel; and ρ_n the radius of curvature at P_1 of the cross section of the ellipsoid through the point P_1 normal to the central meridian.

Then from Figure 4, in the triangle GP_2S, it is apparent that

$$x = l \sin \theta$$

and in the triangle P_1P_2S that

$$y = x \tan \frac{\theta}{2}$$

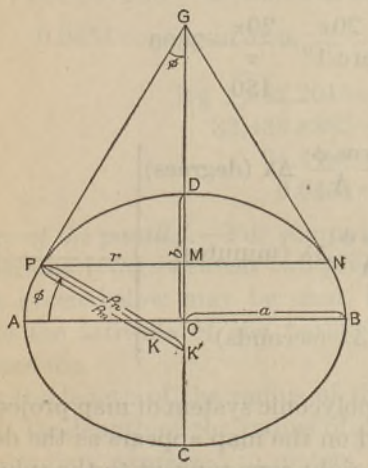

FIGURE 2.—Elements of ellipsoid and tangent cone

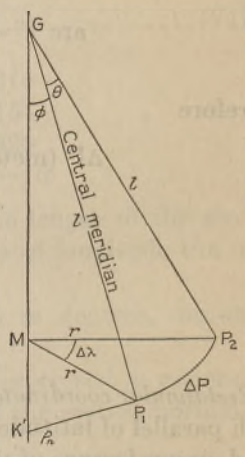

FIGURE 3.—Sector of tangent cone

Substituting the value of x and remembering that $\sin \theta = 2 \sin \frac{\theta}{2} \cos \frac{\theta}{2}$, we have

$$y = 2 l \sin^2 \frac{\theta}{2}$$

From Figure 3, in the triangle GP_1K', it is apparent that

$$l = \rho_n \cot \phi$$

The length of the arc ΔP (fig. 3) is measured by the length of the radius r of the parallel times the central angle $\Delta\lambda$ (in radians), and the same arc is also measured by the length l of the radius of the developed cone times the angle θ (in radians); therefore

$$l\theta = r\Delta\lambda$$

But from Figure 3, in the triangle $P_1K'M$, it is apparent that $r=\rho_n \cos \phi$; therefore

$$\theta=\frac{\rho_n \Delta\lambda \cos \phi}{l}$$

Substituting in this the value of l given above, we have

$$\theta=\Delta\lambda \sin \phi$$

Then, substituting in the expressions for x and y the values of l and θ, we have

$$x=\rho_n \cot \phi \sin (\Delta\lambda \sin \phi)=\frac{\cot \phi \sin (\Delta\lambda \sin \phi)}{A \text{ arc } 1''} \text{ -------[X]}$$

$$y=2\rho_n \cot \phi \sin^2 \frac{1}{2}(\Delta\lambda \sin \phi)=\frac{2 \cot \phi \sin^2 \frac{1}{2}(\Delta\lambda \sin \phi)}{A \text{ arc } 1''} \text{ --[XI]}$$

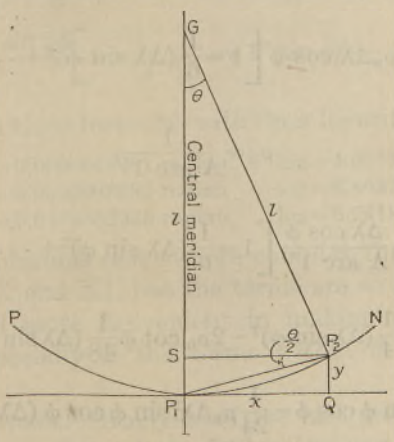

FIGURE 4.—Developed cone

In the two formulas given above the expression $\Delta\lambda \sin \phi$ is approximately the convergence of the meridian, and it will give an angle in the same units as are used for $\Delta\lambda$. For example, if $\Delta\lambda$ is taken in radians, degrees, or minutes the angle $(\Delta\lambda \sin \phi)$ will be in radians, degrees, or minutes, respectively. The expression $\sin \phi$ is really a coefficient of $\Delta\lambda$ just as if it were a quantity like 2 or 4.

Log A is given for each minute of latitude from 0° to 72° in Table 28, Geological Survey Bulletin 650, and in Coast and Geodetic Survey Special Publication 8.

Log arc $1''=4.6855749-10$.

The formulas for x and y given above are exact expressions of the coordinates of the point P. But when $\Delta\lambda$ is small substitution for the quantities $\sin (\Delta\lambda \sin \phi)$ and $\sin^2 \frac{1}{2}(\Delta\lambda \sin \phi)$ of the first two

terms of their expansions will yield formulas more convenient to use and at the same time give satisfactory results. These expressions are

$$\sin(\Delta\lambda \sin\phi) = \Delta\lambda \sin\phi - \frac{1}{6}(\Delta\lambda \sin\phi)^3 + \cdots\cdots$$

$$\sin^2\frac{1}{2}(\Delta\lambda \sin\phi) = \frac{1}{4}(\Delta\lambda \sin\phi)^2 - \frac{1}{48}(\Delta\lambda \sin\phi)^4 + \cdots\cdot$$

Substituting these values in the formulas for x and y, we have

$$x = \rho_n \cot\phi\, \Delta\lambda \sin\phi - \frac{1}{6}\rho_n \cot\phi\, (\Delta\lambda \sin\phi)^3 + \cdots\cdots$$

But $\cot\phi \sin\phi = \cos\phi$; therefore

$$x = \rho_n \Delta\lambda \cos\phi - \frac{1}{6}\rho_n \Delta\lambda \cos\phi\, (\Delta\lambda \sin\phi)^2 + \cdots\cdot$$

or

$$x = \rho_n \Delta\lambda \cos\phi \left[1 - \frac{1}{6}(\Delta\lambda \sin\phi)^2 + \cdots\cdot\right]$$

But

$$\rho_n = \frac{1}{A \text{ arc } 1''}$$

therefore

$$x = \frac{\Delta\lambda \cos\phi}{A \text{ arc } 1''}\left[1 - \frac{1}{6}(\Delta\lambda \sin\phi)^2 + \cdots\cdot\right] \text{---------[XII]}$$

also

$$y = 2\rho_n \cot\phi \frac{1}{4}(\Delta\lambda \sin\phi)^2 - 2\rho_n \cot\phi \frac{1}{48}(\Delta\lambda \sin\phi)^4 + \cdot\cdot\cdot\cdot$$

$$= \frac{1}{2}\rho_n \Delta\lambda^2 \sin\phi \cos\phi - \frac{1}{24}\rho_n \Delta\lambda^2 \sin\phi \cos\phi\, (\Delta\lambda \sin\phi)^2 + \cdot\cdot\cdot$$

$$= \frac{1}{2}\rho_n \Delta\lambda^2 \sin\phi \cos\phi \left[1 - \frac{1}{12}(\Delta\lambda \sin\phi)^2 + \cdot\cdot\cdot\cdot\right]$$

But

$$\sin\phi \cos\phi = \frac{1}{2}\sin 2\phi \text{ and } \rho_n = \frac{1}{A \text{ arc } 1''}$$

therefore

$$y = \frac{\Delta\lambda^2 \sin 2\phi}{4A \text{ arc } 1''}\left[1 - \frac{1}{12}(\Delta\lambda \sin\phi)^2 + \cdot\cdot\cdot\cdot\right] \text{------[XIII]}$$

In these two formulas for x and y $\Delta\lambda$ is expressed in radians. $\Delta\lambda$ may be taken in seconds, minutes, or degrees by using the following relations:

$$\Delta\lambda^r = \Delta\lambda'' \text{ arc } 1''$$

$$\Delta\lambda^r = \Delta\lambda' \text{ arc } 1' = 60\ \Delta\lambda' \text{ arc } 1''$$

$$\Delta\lambda^r = \Delta\lambda^\circ \text{ arc } 1^\circ = 3600\ \Delta\lambda^\circ \text{ arc } 1''$$

and the formulas may be written as follows by substituting in the coefficient the proper value of $\Delta\lambda$ expressed in terms of arc 1″, so as to cancel the term arc 1″ in the denominator, and by substituting in the series the proper value of $\Delta\lambda$ expressed in terms of arc 1″, arc 1′, or arc°, as the case may require:

$$\left.\begin{aligned} x&=\frac{\Delta\lambda''\cos\phi}{A}\left[1-\frac{1}{6}(\Delta\lambda''\ \text{arc}\ 1''\sin\phi)^2+\cdots\right]\\ y&=\frac{(\Delta\lambda'')^2\,\text{arc}\,1''\sin 2\phi}{4A}\left[1-\frac{1}{12}(\Delta\lambda''\text{arc}\ 1''\sin\phi)^2+\cdots\right]\end{aligned}\right\}\ \Delta\lambda\ \text{in seconds}\quad[\text{XIV}]$$

$$\left.\begin{aligned} x&=\frac{60\Delta\lambda'\cos\phi}{A}\left[1-\frac{1}{6}(\Delta\lambda'\text{arc}\ 1'\sin\phi)^2+\cdots\right]\\ y&=\frac{15(\Delta\lambda')^2\,\text{arc}\,1'\sin 2\phi}{A}\left[1-\frac{1}{12}(\Delta\lambda'\text{arc}\ 1'\sin\phi)^2+\cdots\right]\end{aligned}\right\}\ \Delta\lambda\ \text{in minutes}\quad[\text{XV}]$$

$$\left.\begin{aligned} x&=\frac{3600\Delta\lambda^\circ\cos\phi}{A}\left[1-\frac{1}{6}(\Delta\lambda^\circ\text{arc}\ 1^\circ\sin\phi)^2+\cdots\right]\\ y&=\frac{900(\Delta\lambda^\circ)^2\,\text{arc}\,1^\circ\sin 2\phi}{A}\left[1-\frac{1}{12}(\Delta\lambda^\circ\text{arc}\ 1^\circ\sin\phi)^2+\cdots\right]\end{aligned}\right\}\ \Delta\lambda\ \text{in degrees}\quad[\text{XVI}]$$

The constants in these formulas with their logarithms are as follows:

arc 1″ = 0.0000048481 radian	log = 4.6855749 − 10
arc 1′ = 0.0002908882 radian	log = 6.4637262 − 10
arc 1° = 0.0174532925 radian	log = 8.2418774 − 10

This group of formulas seems more complex than the formulas for x and y given in X and XI, but the terms are so arranged that their use will be found more convenient in making a large number of computations, especially if the terms within the brackets can be dropped.

Analysis of formulas.—Analysis of the last group of formulas for x will show that for values of $\Delta\lambda$ of 1° or less and for latitudes of 60° or less the terms within the brackets can be disregarded with a resulting maximum error of +2.2 meters in the abscissa of the developed parallel. The ordinate of the developed parallel of 45° has the greatest value for the same value of $\Delta\lambda$, and for values of $\Delta\lambda$ of 1° or less the terms within the brackets in the formulas for y can be disregarded with a resulting maximum error of +0.007 meter. The following table gives an idea of the errors in the values of x and y resulting from the use of the first term only of these formulas:

Value of $\Delta\lambda$	Latitude 25°				Latitude 50°			
	60′	30′	15′	7½′	60′	30′	15′	7½′
Errors in x, in meters	+0.915	+0.114	+0.014	+0.002	+2.121	+0.267	+0.033	+0.004
Errors in y, in meters	+.0017	+.0001	+.0000	+.0000	+.0071	+.0004	+.0000	+.0000

Even the maximum error of 2.2 meters on the spheroid can not be plotted on any ordinary map projection; consequently where $\Delta\lambda$ does not exceed 60 minutes it is sufficient to use only the first term in the bracket in any one of the last group of formulas for x and y.

Analysis of the formula for ΔP and of the rigid formula for x shows that for short arcs of the parallel of 30′ or less and for latitudes of 50° or less there is very little difference between the actual lengths of the arcs of the parallels and the abscissas of their development, and that either formula may be used for the other. The following table gives an idea of these differences:

Value of $\Delta\lambda$	Latitude 25°			Latitude 50°		
	30′	15′	7½′	30′	15′	7½′
Value of ΔP, in meters	50,475.93	25,237.96	12,618.98	35,849.06	17,924.53	8,962.26
Value of x, in meters	50,475.82	25,237.95	12,618.98	35,848.79	17,924.50	8,962.26

CONVERSION DATA

Values in meters on the spheroid can be transformed easily into measurements in inches on any map scale by reducing meters to inches and dividing the result by the scale relation. In the following table the two operations have been combined into one factor, and the table will be found convenient for use in conversion by logarithms or for use by direct multiplication in a computing machine. The tables are based on the United States legal value of 1 meter = 39.37 inches, log = 1.5951654

Scale	Log to be added	Multiplication factor
1:5,000	7.8966954–10	0.0078740000
1:10,000	7.5951654–10	.0039370000
1:12,000	7.5159842–10	.0032808333
1:20,000	7.2941354–10	.0019685000
1:24,000	7.2149542–10	.0016404167
1:31,250	7.1003154–10	.0012598400
1:31,680	7.0943802–10	.0012427399
1:48,000	6.9139242–10	.0008202083
1:62,500	6.7992854–10	.0006299200
1:63,360	6.7933502–10	.0006213699
1:96,000	6.6128942–10	.0004101042
1:125,000	6.4982554–10	.0003149600
1:192,000	6.3118642–10	.0002050521
1:250,000	6.1972254–10	.0001574800
1:500,000	5.8961954–10	.0000787400
1:750,000	5.7201041–10	.0000524933
1:1,000,000	5.5951654–10	.0000393700

Other interesting data concerning scale relations will be found in Tables 40 and 44, Geological Survey Bulletin 650.

CONSTRUCTION OF PROJECTIONS

Different methods of construction.—Polyconic projections may be constructed by hand, by using the instructions and tables published in Coast and Geodetic Survey Special Publication 5, which gives the required values in meters on the surface of the spheroid, or by using the instructions and tables given in this publication with measurements in inches on the map scale desired; or they may be constructed mechanically by means of a Bumstead projection plate. The practice of the Geological Survey indicates preference in the reverse order from that given above. Directions for constructing projections by hand can be given best by means of practical examples, but in general a central meridian is assumed upon which the intersections of the parallels are plotted to scale. Each parallel is then developed separately as an arc of a circle with its center lying in the extension of the central meridian. The arcs of the developed parallels are subdivided to scale, and the meridians are drawn through the corresponding subdivisions. However, in actual practice on projections of small quadrangles the parallels are not drawn as arcs of circles, but their intersections with the meridians are plotted from the computed x and y values, and the sections of the parallels between adjacent meridians are drawn as straight lines. On polyconic projections of quadrangles of 1° or smaller all meridians may be drawn as straight lines, and in large-scale projections of small quadrangles in low latitudes both meridians and parallels may be drawn as straight lines. For example, the curvature of the parallels of a projection of a 15′ quadrangle in latitudes from 0° to 25° on a scale of 1 : 48,000 or for a 7½′ quadrangle in any latitude on a scale of 1 : 31,680 or larger is so small that it can not be plotted.

The meridional distances given in the tables apply to the central meridian of the projection, but for any standard quadrangle the difference in the curvature of the several parallels is so slight that the distances given for the central meridian can be taken for all other meridians.

Geological Survey method.—For making a polyconic projection by the Geological Survey method it is necessary to have a metal straightedge graduated in inches, with one inch at one end subdivided into hundredths of an inch, the scale being standardized and the straightedge being as long as the longest dimension of the projection; a good rigid-beam compass with micrometer movement; a hard chisel-point pencil; a plotting needle; and the tables in this publication.

To illustrate this method the construction of a polyconic projection on a scale of 1:48,000 of the 15-minute quadrangle lying between north latitudes 40° 15′ and 40° 30′ and between west longitudes 88° 00′ and 88° 15′ is described. (See fig. 5.) The projection will show each 5-minute meridian and parallel. The central meridian of the

projection will represent the meridian of longitude 88° 07½′ and will be used for construction only. Likewise the perpendicular crossing the central meridian at latitude 40° 22½′ will be used for construction only. The geometry of the construction given below is slightly different from previously established practice, owing principally to an effort to eliminate the plotting of the small ordinates of curvature, which is very difficult in a projection of a small quadrangle.

In Table 2 the group of ordinates and meridional distances computed for latitude 40° may safely be used for all latitudes between 39° 30′ and 40° 30′ without interpolation between the values given and those computed for latitudes 39° and 41°. The meridional distance

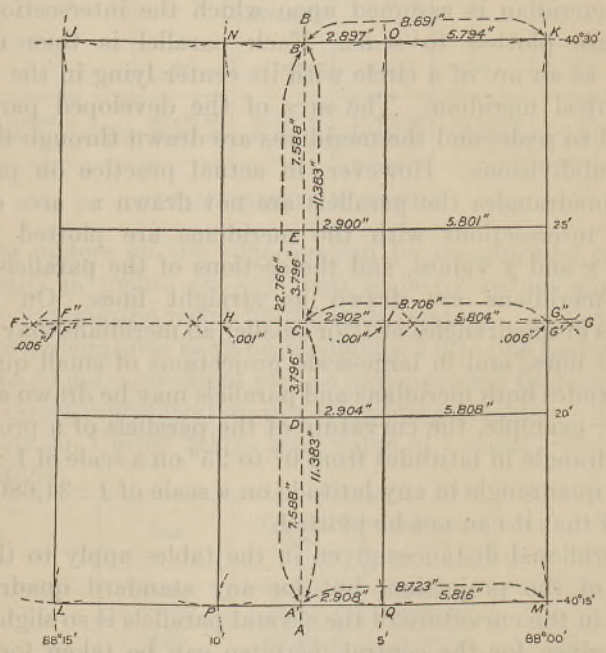

FIGURE 5.—Polyconic projection of 15-minute quadrangle

for 2½′ of latitude is found to be 3.796 inches; for 5′, 7.588 inches; for 7½′ 11.383 inches; for 10′, 15.179 inches; and for 15′, 22.766 inches. In the part of the table headed "Abscissas of developed parallel" the x values for 2½′ and 7½′ of longitude in latitude 40° 15′ are found to be 2.908 inches and 8.723 inches, respectively. The x values for latitude 40° 20′, 40° 22½′, 40° 25′, and 40° 30′ are shown in Figure 5. It should be noted that the measurements given here and on Figure 5 were taken from an old table, and some of them contain small errors in the third decimal place, which have been corrected in Table 2. In the group of ordinates of developed parallel the y value for 7½′ of longitude is found to be 0.006 inch, and for 2½′ of longitude 0.001 inch. These are all the measurements

needed to proceed with the constuction of the projection. It is impossible to plot the y value for 2½′ of longitude and difficult to make an individual plotting of the y value for 7½′ of longitude; but 0.006 can be added to or subtracted from any tabulated length of meridional arcs and the resultant distance measured on the metal scale, and this is done in the following description.

Draw the central construction meridian AB in vertical position near the center of the map; select the mid-point C as the center of the projection, and lay off from C the meridional distances for 2½′ and 7½′ of latitude—CE (3.796 inches) and CB′ (11.383 inches) above and CD (3.796 inches) and CA′(11.383 inches) below. The over-all distance A′B′ (22.766 inches) for 15′ of latitude should be used to check the plotting. At the mid-point C erect the perpendicular FG, using the points A′ and B′ as centers for long arcs and the points D and E as centers for short arcs. Lay off on the construction line FG the abscissas of the developed parallel for 2½′ and 7½′ of longitude for latitude 40° 22½′—CH and CI (2.902 inches) and CF′ and CG′ (8.706 inches).

With the points F′ and G′ as centers and a radius equal to the meridional distance for 7½′ of latitude plus the ordinate for 7½′ of longitude (11.383+0.006=11.389 inches), strike arcs at J and K. Then with the same points as centers and a radius of 11.377 (11.383−0.006) strike arcs at L and M. In striking these arcs use the metal point of the beam compass rather than the pencil point, and either scratch the paper lightly or place under the metal point a small piece of carbon paper made by rubbing a piece of thin tracing paper with a hard pencil. This obviates the inaccuracy of using the pencil point of the beam compass to take an exact measurement from the scale.

With the points H and I as centers and a radius equal to the meridional distance for 7½′ of latitude (11.383 inches), strike arcs at N and O above and P and Q below. The true meridional distance as here used is generally taken in constructing the inner meridional distance of 7½′ of latitude on a scale of 1:48,000 or larger, as it is impracticable to use the small ordinate for 2½′ of longitude. However, should the more rigid construction be required, it may be done in the following manner: With points H and I as centers and a radius equal to the meridional distance for 7½′ of latitude plus the ordinate for 2½′ of longitude (11.383+0.001=11.384 inches), strike arcs at N and O. Then with the same points as centers and a radius equal to the meridional distance minus the 2½′ ordinate (11.383−0.001=11.382 inches), strike arcs at P and Q.

With the points B′ and A′ as centers and radii equal to the proper abscissas, strike arcs at J, K, L, and M, and also at N, O, P, and Q. Check the length of the diagonals JM and KL, which should be exactly the same. Draw the straight lines JL and KM through the

intersections of the arcs at J, L, K, and M, and the straight lines NP and OQ through the intersections of the arcs at N, P, O, and Q. These lines represent the four meridians on the projection, and although theoretically they are curves concave to the central meridian, yet in practice they can be drawn only as straight lines. The four intersections at the top and the four at the bottom of the projection are the exact intersections of the four meridians with the limiting parallels.

With the beam compass set at the length of the meridional distance for 5′ of latitude, plot along all four meridians down from J, N, O, and K and up from L, P, Q, and M, and check the middle 5′ sections of the meridians, thus locating the intersections of the four meridians with the parallels 40° 20′ and 40° 25′.

All the necessary intersections for the projection of this 15′ quadrangle have now been plotted without trying to make an individual plotting of 0.006 inch from the points F′ and G′, which only the most skilled draftsmen can accomplish, and the same setting of the beam compass has been used for all equal measurements, thereby strengthening the construction.

Check the construction by measuring over-all distances and by testing corresponding diagonals of all combinations of projection blocks.

Although it is customary to show only the 5′ intervals on a projection for a 15′ quadrangle, it may be desired to develop the central parallel, which, in the projection under construction, would fall on latitude 40° 22½′. If so, proceed in the following manner: With the beam compass set at the meridional distance for 7½′ and plotting along the meridians down from J and K and checking by plotting up from L and M, locate the points F″ and G″, which are the intersections of the limiting meridians with the central parallel at latitude 40° 22½′. The points H and I already determined are the intersections of this parallel with the inner meridians, as no ordinates can be plotted at these intersections. Draw the parallels by drawing straight lines between the plotted intersections, as the curvature of the parallels of any standard quadrangle within the limits of the United States is too small to be drawn as a curve. Letter the latitude and longitude as shown in Figure 5, add the scale, the name of the quadrangle, and the initials or name of the person making the construction, and the projection is completed. It should, however, be checked carefully by another person.

In any projection where the ordinate of a developed parallel at the limiting meridians is less than 0.005 inch it is impracticable to plot the curvature, and the parallels should be represented as straight lines perpendicular to the central meridian. This will be true of projections of maps of standard 15′ quadrangles between latitudes 0°

and 25° on the scale of 1:48,000 and of standard 7½′ quadrangles in any latitude on scales of 1:31,680 and larger.

Interpolation for other scales.—This bulletin gives tables for all the standard field scales employed by the Geological Survey, but use of other projections may be required, and any table may, with certain limitations, be used for scales half as large or twice as large. The abscissas of developed parallels and the meridional distances are both in direct proportion to the scales and practically in proportion to the latitude and longitude intervals, so that the abscissa for 2′ of longitude at latitude 40° on the scale of 1:24,000 is the same for 1′ of longitude at latitude 40° on the scale of 1:12,000. Likewise the meridional distance given for a latitude interval of 2′ on the scale of 1:24,000 is the same for 1′ on the scale of 1:12,000.

The ordinates of developed parallels are also directly proportional to the scales, but the ordinates are also proportional to the squares of the distances from the central meridian, which may lead to confusion in interpolation for a different scale. For example: For a longitude interval of 5′ in latitude 40° on a scale of 1:24,000 the ordinate of developed parallel is 0.0054 inch. The ordinate is not the same for a longitude interval of 2½′ on a scale of 1:12,000 but is 0.027, or one-half as much.

The following rules may develop discrepancies in the third decimal place, but these will be too small to plot: To halve the scale (for example, to make a projection on a scale of 1:48,000 from tables for the scale of 1:24,000), use correct arguments for the scale desired and divide all values given in the table by 2. To double the scale (for example, to make a projection on a scale of 1:12,000 from tables for the scale of 1:24,000), use correct arguments for the scale desired and multiply all values given in the table by 2.

Polyconic projections on scales for which no convenient tables are given with data in inches are best constructed directly from the data given in Coast and Geodetic Survey Special Publication 5, the dimensions in meters on the spheroid being reduced to meters on the map scale and plotted by means of a metric scale. Instructions for making projections by this method are given in Special Publication 5 and also in Geological Survey Bulletin 788–E.

MODIFIED POLYCONIC PROJECTION OF MAP OF THE WORLD ON THE MILLIONTH SCALE

GENERAL SPECIFICATIONS

On November 22, 1909, the International Map Committee adopted uniform specifications for the sheets of the map of the world on a scale of 1:1,000,000. Each sheet of this series of maps covers an area of 4° of latitude by 6° of longitude and is designated by a letter and a number preceded by the word "North" for the northern hemisphere

and by the word "South" for the southern hemisphere. Reckoning from the Equator to the north or to the south, each 4° belt of latitude is designated by a letter—A for the belt from 0° to 4°, B for the belt from 4° to 8°, etc. Reckoning from the international date line at 180° longitude (east or west of Greenwich) each zone of 6° of longitude is designated by a number—1 for the zone from 180° to 174° west longitude, 2 for the zone 174° to 168°, etc., up to 60 for the zone 174° to 180° east longitude. Thus the Boston sheet, covering the area between north latitudes 40° and 44° and between west longitudes 66° and 72°, is designated "North K–19."

The projection adopted for the sheets of this series of maps is a modified polyconic projection so designed as to represent all the meridians as straight lines on the map and to make the average scale error as nearly zero as possible by bringing the top and bottom parallels of the ordinary American polyconic development closer together without alteration, so that the scale will be true along these two parallels and along the meridians 2° east and west of the central meridian. The result is that the scales along the other interior meridians are reduced and the scale along the limiting meridians is enlarged. This arrangement gives four instead of three lines of strength in which the scale is true, and the maximum error in any other line is much less than in the American polyconic projection.

The top and bottom parallels of each sheet are drawn in the usual way, as circles with centers lying in the prolongation of the central meridian, but are actually plotted from the rectangular coordinates of the intersections of the two parallels with the several meridians. These two parallels are therefore subdivided true to scale. Straight lines representing the meridians are then drawn connecting corresponding intersections on the top and bottom parallels.

In the resolutions of the International Map Committee it is not stated how the 4° lengths of the meridians are to be subdivided. United States Coast and Geodetic Survey Special Publication 68 states that "no doubt, an equal division of the central meridian was intended." Arthur R. Hinks, in his admirable treatise "Map projections," states, "it may be supposed that they are divided equally." Antoni Lomnicki, in a paper entitled "Projekcja Miedzynarodowej Mapy Swiata," published at Lwow in 1927, comments as follows: "It has been ascertained that these differences are so insignificant as to be a negligible quantity on a map drawn to a scale of 1/M, a fact which nevertheless should not be omitted in the instructions."

It has been the practice of the United States Geological Survey to compile the sheets in four quarters on the scale of 1:500,000 and to subdivide each meridian in proportion to the correct length of each 1° interval of latitude. Therefore, these new tables have been constructed on that basis.

JOINING OF SHEETS

Any 4° by 6° sheet will join exactly with the four sheets on its margins, but the corner sheets to complete a block of nine will not fit along their two adjacent edges simultaneously; they will fit on one edge, but there will be in theory on the other a small wedge-shaped gap, as is shown in Figure 6. In practice these gaps will be found to be very small, usually less than the average expansion or shrinkage of map paper. The map user will seldom desire to join together exactly more than nine sheets at once. Many objections have been made to the use of this projection because of this difficulty in joining corner sheets and because of distortions in scale, azimuth, and shapes near the east and west limits of the sheets, but there does not seem to be any other projection of sufficiently greater merit to offset the principal advantages of the modified polyconic projection, which are its ease of construction from simple tables and its adaptability to

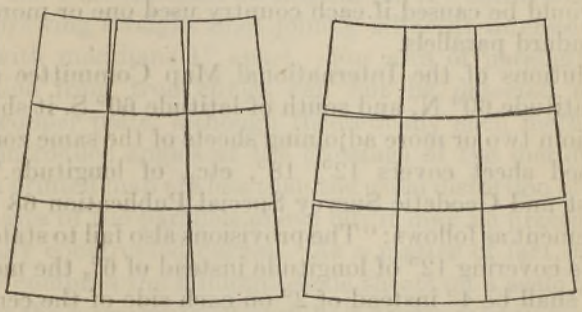

FIGURE 6.—Junction of sheets of map of the world

small groups of sheets representing areas in any part of the world. Any errors in a single sheet are negligible in view of the limitations of drafting, engraving, and quality of map paper. For example, the maximum error in scale occurs along the east and west meridians of a sheet representing an area between latitudes 0° and 4° and is about 1/1300, or +0.076 per cent; on the scale of 1 : 1,000,000 this amounts to about one-third of a millimeter in the total height of the sheet. The substitution of the Lambert conformal projection or the Albers conical equal-area projection has been suggested. The writer has investigated the effect of the use of the Lambert conformal projection for the millionth-scale sheets of the area of the United States and finds that, in the area between latitudes 24° and 52°, the Lambert conformal projection would probably be based on two standard parallels at latitudes 29° and 47°. Such a projection would introduce scale errors averaging about +1 per cent in sheets representing areas adjacent to the limiting parallels (24° and 52°) and averaging

−1 per cent in sheets representing areas between latitudes 36° and 40°, although the scale would be correct in sheets for areas along the two standard parallels. Sheets on the modified polyconic projection representing areas between latitudes 24° and 28° introduce maximum scale errors of only 0.06 per cent, and between latitudes 48° and 52° of only 0.03 per cent, which are less than the usual distortion of map paper. Therefore for all practical purposes maps on the modified polyconic projection covering any area in the United States are as true to scale as maps on the Lambert conformal projection for areas along the standard parallels. Surely the necessity of correcting all distance measurements on a sheet by an amount as large as 1 per cent would be a distinct disadvantage. Of course it would be possible to select zones of lesser extent in latitude, even to the extreme case of considering each row of 4° by 6° areas a separate zone, with two standard parallels for each zone, but any of these selections would involve difficulty in joining sheets in adjacent zones, and much confusion would be caused if each country used one or more different pairs of standard parallels.

The resolutions of the International Map Committee state that "north of latitude 60° N. and south of latitude 60° S. it shall be permissible to join two or more adjoining sheets of the same zone, so that the combined sheet covers 12°, 18°, etc., of longitude." United States Coast and Geodetic Survey Special Publication 68 comments on this statement as follows: "The provisions also fail to state whether, in the sheets covering 12° of longitude instead of 6°, the meridians of true length shall be 4° instead of 2° on each side of the central meridian; but such was no doubt the intention." A. R. Hinks makes a similar statement in his book on map projections. The writer doubts the correctness of this interpretation but thinks that the committee had in mind simply the assemblage of two or more independently constructed sheets in a single map so as to avoid a series of maps of very small width. In other words, he thinks that the committee had in mind a printing and distribution problem rather than a cartographic problem. A row of 4° by 12° sheets would fail to join a row of 4° by 6° sheets immediately to the south by wedges similar to those illustrated in Figure 6, whether the sheets were constructed with 4° or 8° between the standard meridians, but if the interval were 8° the maximum scale error in the northern row would be increased four times. The Geological Survey has not yet compiled any sheets of the millionth-scale series for areas north of latitude 60°, and it hopes that before it is required to do so the International Map Committee will decide the matter definitely.

DRAWING OF PARALLELS

There has been considerable discussion of the difficulty of drawing the arcs of circles representing the limiting parallels and the curves representing the three interior parallels, which Lomnicki calls shortened epicycloids. The maximum deviation of the curve representing a 1° arc of a parallel from the chord joining the ends of such a curve is in latitude approximately 45°, and on a scale of 1:1,000,000 the maximum ordinate from the mid-point of such a chord to the curve is 0.1 millimeter. It is practically impossible for a draftsman to draw such a curve, as the deviation from a straight line is only about the width of a finely inked line. It is equally impracticable to construct and use a compass bar long enough to draw the arcs of the parallels, requiring for the scale of 1:1,000,000 a radius of about 4 meters for the circle representing the parallel of 60°, one of about 8 meters for the parallel of 40°, and one of over 90 meters for the parallel of 4°. Therefore the United States Geological Survey constructs these parallels by drawing straight lines joining adjacent intersections of the parallels with meridians 1° apart. For arcs of parallels below 50° the deviation from true circles can not be detected even on an engraved copper plate, although theoretically such methods of construction introduce angles at the crossings of the meridians. Such errors on a printed map are less than the usual distortion of map paper. For short arcs of the parallels above 60° it may be practicable to use mechanically constructed curves. As a matter of fact, the Geological Survey compiles the millionth-scale sheets on a scale of 1:500,000 by plotting the intersection of each half degree meridian and parallel, but in publication the engraver constructs a new projection on the copper plate instead of copying photographically the results of the cartographer's compilation.

DESCRIPTION OF TABLES

Table 5 gives the length of each developed meridian and the x and y coordinates of the intersection of each meridian with each of the developed parallels, in meters on the natural scale. To convert these data into map distances on the scale of 1:1,000,000, move the decimal point three places to the left and plot in millimeters. For the scale of 1:500,000 follow the same rule and then double all the measurements. Table 6 gives the data in inches on the scale of 1:1,000,000. Each 1° length of the standard meridians (2° from the central meridian) and the x and y coordinates of the intersections of all three meridians east and west of the center meridian with the upper and lower developed parallels of each sheet (0°, 4°, 8°, 12°, etc.) were computed by the rigid formulas given hereafter in this paper. In making these computations the dimensions of the spheroid

given in the proceedings of the International Map Committee at the meeting in London in November, 1909, were used, as follows:

Semimajor axis a = 6,378,240 meters
Semiminor axis b = 6,356,560 meters

These dimensions differ slightly from those developed by Col. A. R. Clarke in 1880, which were—

a = 6,378,249 meters
b = 6,356,515 meters

After the x and y coordinates of the intersections of each of the meridians with the upper and lower parallels were computed, each 4° length of the central meridian and of the meridians 1° and 3° from the central meridian were computed by simple formulas, as described hereafter in this paper. The length of the shortened central meridian could have been computed directly by the formulas given by M. Ch. Lallemand[1] and the lengths of the other developed meridians could then be computed by applying the simple formulas for the magnification of meridians of the polyconic projection. Each 4° length of these three meridians was then divided into 1° lengths in direct proportion to the true 1° lengths of the meridian as represented by the 1° lengths of the standard meridians 2° from the center. These 4° meridional lengths could be divided into four equal parts, and the errors introduced would be small—for example, in the 1° meridional length between latitudes 43° and 44° the maximum error would be about 30 meters, or 0.03 millimeter on a scale of 1:1,000,000. This difference can not be plotted, but for the purpose of analysis and for large-scale compilations it seemed desirable to calculate the meridional lengths in their true relation. The x and y coordinates for the intersections of the meridians with the three inner parallels were then calculated by subdividing the 4° differences in the values of x and y into 1° units in the same proportion as the 4° lengths of the meridians were subdivided. It would have been sufficient for all practical purposes to divide by 4 the 4° differences in the values of x and y and then add one-fourth, one-half, and three-fourths of these quantities to the x and y values for the proper limiting parallel. Moreover, the simple approximate formulas for x and y (with slight modifications) given by Lallemand could have been used without seriously affecting the accuracy of the results.

Lomnicki has suggested that tables for the modified polyconic projection should be computed on the basis of the Hayford spheroid, which probably represents the actual shape of the earth better than

[1] Paris Acad. Sci. Compt. Rend., vol. 153, p. 561, 1911.

any other spheroid yet developed. The dimensions of this spheroid were published by Hayford as follows:

a = 6,378,388 meters
b = 6,356,909 meters

The writer has computed the lengths of each 1° meridional arc for the standard meridian 2° from the central meridian between latitudes 40° and 44°, based on the Hayford spheroid, and the table given below permits a comparison of these values with those based on the Clarke spheroid.

Lengths of meridian 2° from central meridian, in meters, natural scale

Latitude	Clarke spheroid, 1880	Hayford spheroid
40°–41°	111,042.2	111,047.4
41°–42°	111,061.8	111,066.8
42°–43°	111,081.5	111,086.3
43°–44°	111,101.3	111,105.9
40°–44°	444,286.8	444,306.4

The difference in the 4° length of the meridian is less than 20 meters on the spheroid, or 0.02 millimeter on a scale of 1 : 1,000,000. It is apparent that these small differences can not be plotted, but if for any reason the commission should desire to have these tables computed on the basis of the Hayford spheroid, the Geological Survey will be glad to do the work. However, before taking any such action it seems desirable to have comments and criticism on the tables presented herewith, particularly as to their general form. Moreover, it seems desirable to have the commission settle definitely the size of sheets and the arrangement of standard meridians to be used in latitudes above 60°.

METHOD OF CONSTRUCTION OF PROJECTION

If a map of a millionth-scale unit area is to be compiled in a single sheet on a scale of 1 : 1,000,000, it will not be necessary to plot the x and y coordinates of the interior intersections but only to plot the intersections of each meridian with the upper and lower parallels and then draw the meridians as straight lines and subdivide each one of them either into four equal parts or in proportion to their actual 1° lengths. If the map is to be compiled on a scale much larger than that of publication, it is advisable to plot the x and y coordinates of the intersection of each 1° meridian and parallel, and it may be desirable for the cartographer to construct the intersection of each half degree meridian and parallel.

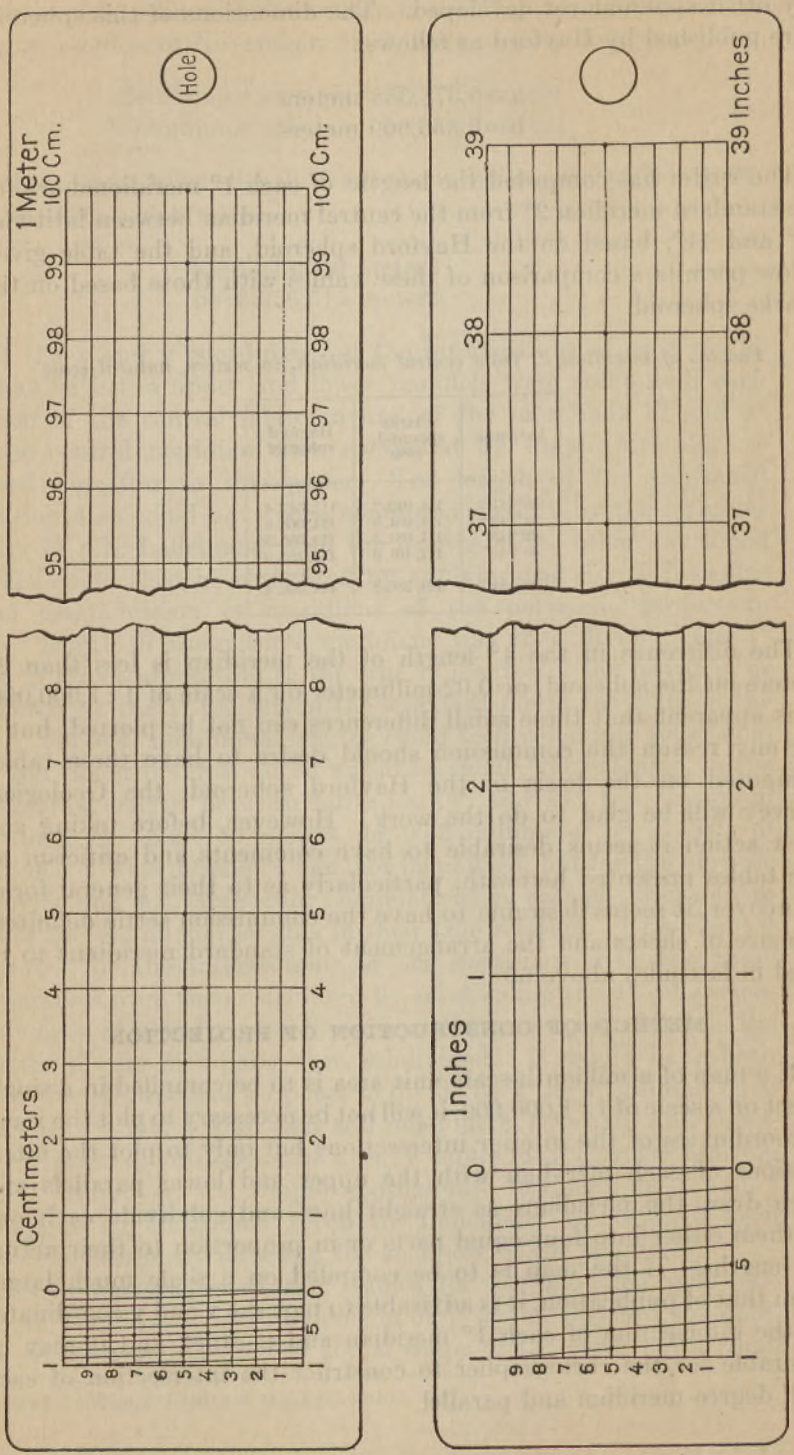

FIGURE 7.—Special scale used by the United States Geological Survey

It is often difficult to plot the small ordinates of the intersections, but it is practicable to add these values to or subtract them from the lengths of the meridional arcs and to construct the projection without making a single individual plotting of a small ordinate. This method involves the initial construction of the abscissa of the central parallel and permits the construction of each intersection, by coordinates, or only the intersections of the meridians with the limiting parallels, as may be desired. The difficulty of constructing abscissas at right angles to the central meridian near the upper and lower edges of the compilation sheet, together with the difficulty of making individual plottings of the small ordinates, seems to warrant the presentation of this method in this paper. In so doing the writer has taken the example of the construction of sheet K–18, embracing the area between latitudes 40° and 44° north and longitudes 72° and 78° west.

The following materials are required: A standard metal scale 1 meter long subdivided throughout in centimeters and with 1 centimeter length at one end subdivided into tenths of millimeters (scales used by the United States Geological Survey accomplish the graduation of millimeters into tenths by means of diagonal scales; see fig. 7); a good rigid-beam compass with micrometer movement; a hard chisel-point pencil; a plotting needle; and a copy of United States Geological Survey Modified Polyconic Projection Tables.

Make a working diagram of the projection and enter on it from the tables all the dimensions that are needed. (See fig. 8.)

Draw the central meridian AB, representing the meridian of 75° west, near the center of the map sheet; select the middle point C as the center of the projection, and lay off from C the meridional distances for 2° of latitude on the central meridian above and below the central parallel of 42° north; CB′=222.11 millimeters and CA′=222.03 millimeters. Subdivide these into 1° lengths, as B′E=111.07 millimeters, CE=111.04 millimeters; check the over-all distance A′B′=444.14 millimeters. If there is any material difference between the computed lengths of CA′ and CB′ (more than 0.1 millimeter) lay off for purposes of construction the points A and B about 1 centimeter below and above A′ and B′, respectively, and exactly equidistant from C. At the point C erect the perpendicular FG, using the points A′ and B′ (or A and B) as centers of long arcs and the points D and E as centers of short arcs. This line FG is the X axis of the parallel representing latitude 42°. Lay off on the line FG the abscissas (x values) of the developed parallel for 1°, 2°, and 3° of longitude from the central meridian; CJ=CK=82.80 millimeters, CH=CI=165.59 millimeters, and CF′=CG′=248.36 millimeters.

With the points F′ and G′ as centers and a radius equal to the meridional distance between latitudes 42° and 44° along the meridian

3° from the central meridian plus the ordinate (y value) of the developed parallel for latitude 44° at the meridian 3° from the central meridian (222.28 + 4.36 = 226.64 millimeters), strike arcs at L and M. Then with the same points as centers and a radius equal to the meridional distance between latitudes 40° and 42° minus the ordinate for 40° (222.20 − 4.31 = 217.89 millimeters), strike arcs at N and O. In drawing these arcs use the metal point of the beam compass rather than the pencil point, and either scratch the paper lightly or place under the metal point a small piece of carbon paper made by rubbing a piece of thin tracing paper with a hard pencil. This eliminates the

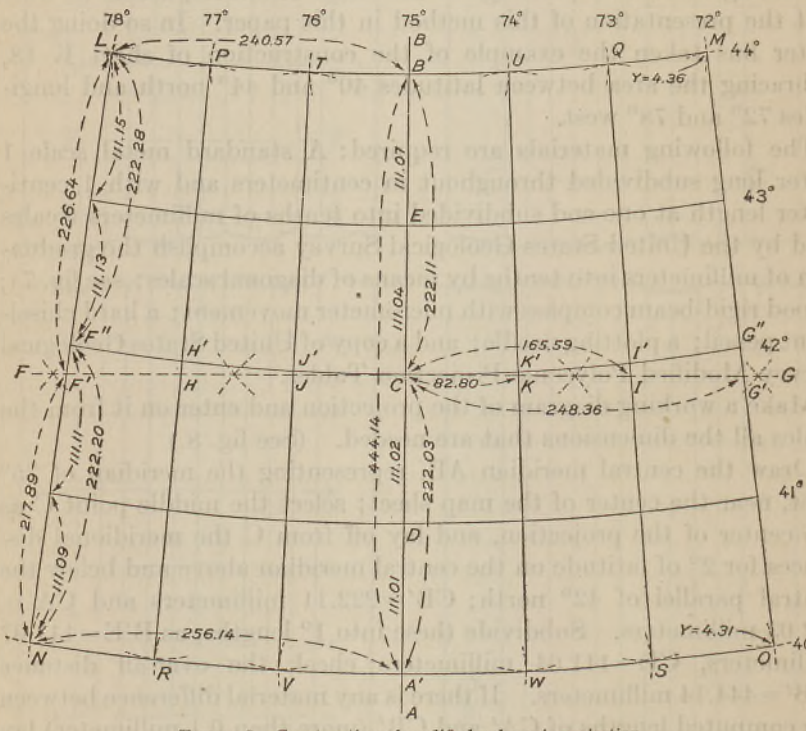

FIGURE 8.—Construction of modified polyconic projection

inaccuracy of using the pencil point of the beam compass to take an exact measurement from the scale.

Then in a similar manner and with the points H and I and the points J and K as centers and with radii equal to the proper meridional distances plus or minus the corresponding ordinates, as the case may be, strike arcs at P, Q, R, and S and at T, U, V, and W. With the points B′ and A′ as centers and with radii equal to the proper abscissas strike arcs at L, M, N, and O, at P, Q, R, and S, and at T, U, V, and W. (Note that theoretically these radii should be the chords joining the ends of the developed parallel, but in the maximum curvature of the developed 3° parallel of 60° latitude the difference between the chord

and the abscissa on the scale of 1 : 1,000,000 is only +0.04 millimeter, which can not be plotted.)

Before proceeding further check the over-all diagonals of the projection LO = MN and if not exactly the same try the diagonals CL = CM and CN = CO so as to locate and correct any inaccuracy of the construction thus far. Draw the developed meridians as straight lines joining L and N, P and R, etc., and draw the developed limiting parallels as straight lines (or smooth curves) joining B′ and T, A′ and V, etc. This gives all of the projection except the three interior parallels.

With the beam compass set at the length of the developed meridional arc between 42° and 44° for each meridian, plot downward along the meridians from L and M, from P and Q, etc., locating the intersections F″, G″, H′, I′, etc. Then with the beam compass set at the length of the developed meridional arc between 40° and 42° for each pair of meridians plot upward along the meridians from N and O, from R and S, etc., thus checking the locations of the intersections along the central parallel. In a similar manner locate the intersections of the meridians with the parallels of 41° and 43° by plotting 1° lengths of developed meridian from the extreme parallels and checking from the central parallel. Construct the three central parallels by drawing straight lines between adjacent points of intersection with meridians or by drawing smooth curves through these points.

Add the latitude and longitude designations of each degree intersection along the limiting meridians and parallels. Add the name and number of the sheet, the scale, the type of projection, and the name of the man making the projection and the date on which it was made. These may seem to be matters of minor detail, but the writer has noticed failure to include these data so many times that he ventures to call attention to their importance.

The projection is now completed and has been constructed in an orderly manner, with a minimum number of settings of the beam compass and without making a single individual plotting of any of the small ordinates. The projection should be checked carefully by another cartographer.

THEORY OF THE MODIFIED POLYCONIC PROJECTION

Nomenclature.—The practical cartographer is often confused by the nomenclature relating to map projections, largely because cartographers and mathematicians of different countries use different symbols for the same thing. Except for one or two terms, the writer has used the nomenclature employed by the United States Coast and Geodetic Survey in its recent publications. The symbols used in

developing the theory of the polyconic projection, with their corresponding definitions, are as follows:

a = semimajor axis of the earth or spheroid.

b = semiminor axis of the earth or spheroid.

e = eccentricity of generating ellipse $= \sqrt{\frac{a^2-b^2}{a^2}}$

f = flattening of generating ellipse $= \frac{a-b}{a}$

n = constant $= \frac{a-b}{a+b}$

ρ_m = radius of curvature of a meridional section.

ρ_n = radius of curvature of a section normal to the meridian.

ϕ = astronomic or geographic latitude of a point on the earth.

Ψ = geocentric latitude of a point on the earth.

$\Delta\phi$ = difference of latitude between two points on the same meridian.

λ = longitude of a point on the earth with reference to Greenwich.

$\Delta\lambda$ = difference of longitude between two points on the same parallel or the angle at the pole between the meridians passing through these points.

M = length of arc of a meridian from the Equator to latitude ϕ.

ΔM = length of arc of a meridian between two parallels.

L = length of an arc of a parallel from the meridian of Greenwich to longitude λ.

ΔL = length of an arc of a parallel between two meridians.

θ = angle at the apex of the developed tangent cone between the central meridian and another meridian.

l = slant height of the tangent cone or the radius of the developed parallel.

x = abscissa of any point on a developed parallel with reference to the central meridian.

y = ordinate of any point on a developed parallel with reference to the tangent to that parallel at the central meridian.

Dimensions of the spheroid.—In the modified polyconic projection dimensions of the spheroid differing only slightly from those developed by Clarke in 1880 have been used, as follows:

$a = 6{,}378{,}240$ meters	$\log a = 6.8047008568$
$b = 6{,}356{,}560$ meters	$\log b = 6.8032221507$
$\frac{b}{a} = 0.9966009432$	$\log \frac{b}{a} = 9.9985212938-10$
$\frac{b^2}{a^2} = 0.9932134400$	$\log \frac{b^2}{a^2} = 9.9970425877-10$
$e^2 = 0.0067865600$	$\log e^2 = 7.8316496930-10$
$f = \frac{1}{294.199}$	$\log f = 7.5313588078-10$
$n = 0.0017024217$	$\log n = 7.2310671463-10$

Radii of curvature.—It is not necessary to compute the radius of curvature of a meridional section, as the meridional arcs are too long to permit the computation of their length by the approximate formula $\Delta M = \rho_m \Delta\phi$. However, in case it is desired to find the values of ρ_m the following formula may be used:

$$\rho_m = \frac{a(1-e^2)}{(1-e^2\sin^2\phi)^{\frac{3}{2}}}$$

Values of the radius of curvature of a section normal to the meridian (ρ_n) are needed in the computation of x and y and must be computed for each fourth degree of latitude, 0°, 4°, 8°, etc. Values of ρ_n are used in computing the lengths of the arcs of the parallel, but as the lengths of these arcs are not needed in constructing or checking the projection, it is not necessary to compute the values of ΔL. The following formula is used for values of ρ_n:

$$\rho_n = \frac{a}{(1-e^2\sin^2\phi)^{\frac{1}{2}}}$$

Values of ρ_n and their logarithms for each fourth degree of latitude from 0° to 60° are given in the following table:

Radii and logarithms of radii of curvature of section normal to meridian for each fourth degree of latitude from 0° to 60°

[Values of ρ_n in meters, based on Clarke spheroid of 1880]

Latitude	ρ_n	Log ρ_n
°		
0	6,378,240.000	6.8047008568
4	6,378,345.318	6.8047080207
8	6,378,659.251	6.8047294026
12	6,379,175.780	6.8047645694
16	6,379,884.995	6.8048128504
20	6,380,773.276	6.8048733134
24	6,381,823.547	6.8049447921
28	6,383,015.586	6.8050259049
32	6,384,326.402	6.8051150824
36	6,385,730.701	6.8052105995
40	6,387,201.280	6.8053106023
44	6,388,709.631	6.8054131497
48	6,390,226.444	6.8055162481
52	6,391,722.180	6.8056178898
56	6,393,167.653	6.8057160934
60	6,394,534.596	6.8058089413

Order of computations.—The procedure followed in computing the lengths of the meridional arcs and the values of the x and y coordinates is not as simple as for the American polyconic projection, because only the length of the standard meridians and the x and y values of intersections of the meridians with the upper and lower parallels can be computed by the formulas used for the American polyconic projection. Lomnicki, in the publication cited above, gives rigid formulas for computing the x and y coordinates of any point on the map, but these formulas are very intricate, and their

use is not advised. Lallemand, in the paper cited above, gives approximate formulas for the length of the central meridian and for the x and y coordinates of intersections of the meridians with the central parallel. These formulas in their general terms are intricate, and in simplifying them for application to the scale of 1:1,000,000 Lallemand has apparently used the Hayford spheroid rather than the Clarke spheroid of 1880. The writer has attempted to modify these simplified approximate formulas to apply to the Clarke spheroid of 1880 and has given them below, following the formulas used in computing these tables. Lallemand's formula for length of the central meridian (as modified) can be used without introducing serious errors, and the length of the other meridians can be computed with reasonable accuracy by applying simple factors of magnification. The writer has, however, further modified this approximate formula by giving a separate one for each meridian. Lallemand's formulas for x and y (as modified) can be used for the coordinates of the intersections of the meridians with any of the parallels without introducing serious errors on the scale of 1:1,000,000. Besides modifying these to conform to the Clarke spheroid of 1880, the writer has given a separate formula for x for each of the five parallels.

However, it seemed desirable to compute the tables presented herewith as follows: Compute the 1° lengths of the standard meridians 2° from the central meridian on the assumption that these lengths are exactly true to scale; compute the x and y coordinates of each meridian with the two standard (upper and lower) parallels; calculate the 4° meridional lengths for the central meridian and for the meridians 1° and 3° from the central meridian; subdivide these 4° meridional lengths into 1° lengths in the same proportion as the computed 1° lengths of the standard meridian bear to the 4° length of that meridian; and finally calculate the x and y coordinates of the points of intersections of the meridians with the three inner parallels. By orderly tabulation and use of computing machines the task was not difficult. The values were computed to tenths of a meter on the natural scale, which, while far beyond the needs of map projection on a scale of 1:1,000,000, may be useful in making computations on a larger scale.

Lengths of the meridians.—The length of the standard meridians 2° from the central meridian is true to scale, and each 1° length may be computed by the following formula for the American polyconic projection (see VII, p. 13), it being sufficient for all practical purposes to use the first three terms only:

$$\Delta M_2 = A_0\Delta\phi - A_2 \cos 2\phi \sin \Delta\phi + A_4 \cos 4\phi \sin 2\Delta\phi - A_6 \cos 6\phi \sin 3\Delta\phi + \ldots . \qquad [XVII]$$

in which

ΔM_2 = length of arc of the standard meridian, expressed in meters.
$\phi = \frac{1}{2}(\phi_2 + \phi_1)$ = mean latitude of meridional arc.
$\Delta\phi = (\phi_2 - \phi_1)$ = arc of standard meridian, expressed in degrees.

$A_0 = 111{,}132.1753$ meters	$\log = 5.0458398153$
$A_2 = 32{,}519.9882$ meters	$\log = 4.5121503781$
$A_4 = 34.6017$ meters	$\log = 1.5390974$
$A_6 = 0.0458$ meters	$\log = 8.66108 - 10$

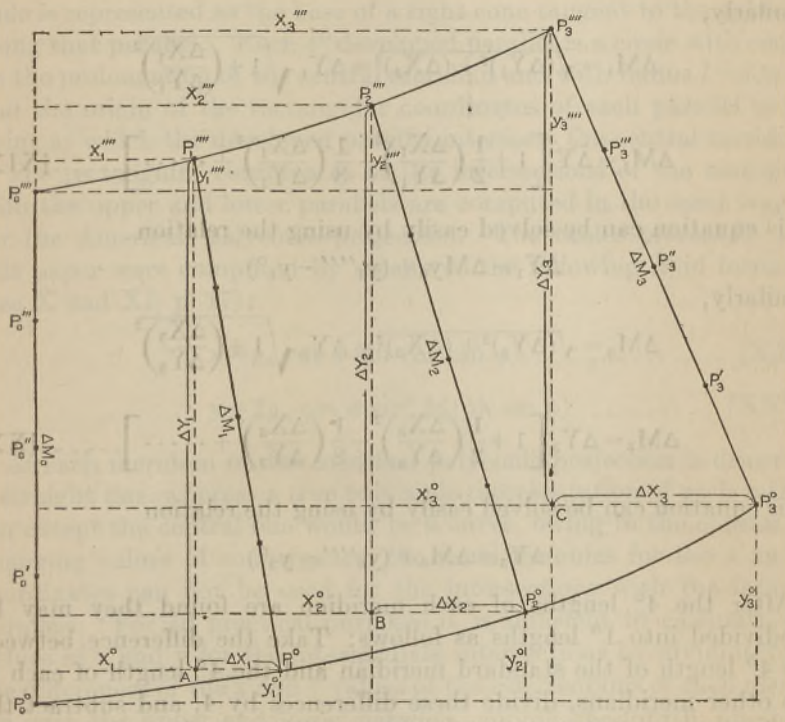

FIGURE 9.—Computation of modified polyconic projection tables

The formula given above may of course be used to compute either the 1° or the 4° length of the standard meridian, by using $\Delta\phi = 1°$ or 4°, respectively.

After the x and y coordinates of the intersections of all the meridians with the upper and lower parallels are computed, the length of the central meridian and of the meridians 1° and 3° from the central meridian may be computed by formulas developed as follows (see fig. 9):

In the right triangle B $P_2°$ P_2''''

$$\Delta Y_2 = \sqrt{(\Delta M_2)^2 - (\Delta X_2)^2} = \Delta M_2 \sqrt{1 - \left(\frac{\Delta X_2}{\Delta M_2}\right)^2}$$

Expanding the radical as a binomial series into terms which can be handled conveniently, we have

$$\Delta Y_2 = \Delta M_2 \left[1 - \frac{1}{2}\left(\frac{\Delta X_2}{\Delta M_2}\right)^2 - \frac{1}{8}\left(\frac{\Delta X_2}{\Delta M_2}\right)^4 - \cdots \right]$$

but

$$\Delta M_0 = \Delta Y_2 - (y_2'''' - y_2^\circ);$$

therefore

$$\Delta M_0 = \Delta M_2 \left[1 - \frac{1}{2}\left(\frac{\Delta X_2}{\Delta M_2}\right)^2 - \frac{1}{8}\left(\frac{\Delta X_2}{\Delta M_2}\right)^4 \right] - [y_2'''' - y_2^\circ] \quad \text{[XVIII]}$$

Similarly,

$$\Delta M_1 = \sqrt{(\Delta Y_1)^2 + (\Delta X_1)^2} = \Delta Y_1 \sqrt{1 + \left(\frac{\Delta X_1}{\Delta Y_1}\right)^2}$$

or

$$\Delta M_1 = \Delta Y_1 \left[1 + \frac{1}{2}\left(\frac{\Delta X_1}{\Delta Y_1}\right)^2 - \frac{1}{8}\left(\frac{\Delta X_1}{\Delta Y_1}\right)^4 + \cdots \right] \quad \text{[XIX]}$$

This equation can be solved easily by using the relation

$$\Delta Y_1 = \Delta M y_0 + (y_1'''' - y_1^\circ)$$

Similarly,

$$\Delta M_3 = \sqrt{(\Delta Y_3)^2 + (\Delta X_3)^2} = \Delta Y_3 \sqrt{1 + \left(\frac{\Delta X_3}{\Delta Y_3}\right)^2}$$

or

$$\Delta M_3 = \Delta Y_3 \left[1 + \frac{1}{2}\left(\frac{\Delta X_3}{\Delta Y_3}\right)^2 - \frac{1}{8}\left(\frac{\Delta X_3}{\Delta Y_3}\right)^4 + \cdots \right] \quad \text{[XX]}$$

This equation can be solved easily by using the relation

$$\Delta Y_3 = \Delta M_0 + (y_3'''' - y_3^\circ)$$

After the 4° lengths of each meridian are found they may be subdivided into 1° lengths as follows: Take the difference between the 4° length of the standard meridian and the 4° length of each of the other meridians, divide these differences by 4, and subtract the results from or add them to each 1° length of the standard meridian. If the 4° lengths of a meridian are divided into four equal parts, as is the practice of most cartographers, the errors introduced are small; for example, in the belt between latitudes 40° and 41° the maximum error is 30 meters on the spheroid, or 0.03 millimeter on the scale of 1:1,000,000. This difference can not be plotted, but if the sheets are compiled on a larger scale it may be advisable to subdivide the 4° lengths in true proportion.

The 4° lengths of these meridians can be computed in terms of millimeters on the scale of 1:1,000,000 without introducing serious errors by the use of Lallemand's approximate formulas, modified slightly to conform to the Clarke spheroid of 1880 and to the nomenclature used in this paper, as follows:

Length of central meridian,

$$\Delta M_0 = 444.40 \text{ mm.} - 2.35 \text{ mm. } \cos 2\phi \text{ ---------- [XXI]}$$

Length of meridian 1° from center,

$$\Delta M_1 = 444.45 \text{ mm.} - 2.30 \text{ mm. } \cos 2\phi \text{ ---------- [XXII]}$$

Length of meridian 2° from center,

$$\Delta M_2 = 444.50 \text{ mm.} - 2.25 \text{ mm. } \cos 2\phi \text{ ---------- [XXIII]}$$

Length of meridian 3° from center,

$$\Delta M_3 = 444.70 \text{ mm.} - 2.10 \text{ mm. } \cos 2\phi \text{ ---------- [XXIV]}$$

Rectangular coordinates.—In the modified polyconic projection each of the parallels marking the boundaries of zones of 4° of latitude is represented as the base of a right cone tangent to the spheroid along that parallel. Each 4° developed parallel is a circle with center on the prolongation of the central meridian and with radius $l = \rho_n \cot\phi$, and the origin of the rectangular coordinates of each parallel is the point at which the developed parallel intersects the central meridian.

The rectangular coordinates of the intersections of the meridians with the upper and lower parallels are computed in the same way as for the American polyconic projection. The tables presented with this paper were computed by means of the following rigid formulas (see X and XI, p. 17):

$$x = \rho_n \cot \phi \sin (\Delta\lambda \sin \phi) \text{ ---------- [XXV]}$$

$$y = 2\rho_n \cot \phi \sin^2 \tfrac{1}{2}(\Delta\lambda \sin \phi) \text{ ---------- [XXVI]}$$

As each meridian on the modified polyconic projection is drawn as a straight line, whereas a true polyconic representation of each meridian except the central one would be a curve, owing to the constantly changing values of convergence, the usual formulas for the x and y coordinates can not be used for the intersections with the interior parallels. For all practical purposes it is sufficient to calculate the values of x and y for the intermediate intersections by dividing by 4 the differences of the x and y values of the intersections of each meridian with the upper and lower parallels, adding one-fourth, one-half, and three-fourths of the x difference to the x value for the upper parallel (or subtracting them from the x value for the lower parallel), and adding one-fourth, one-half, and three-fourths of the y difference to the y value for the lower parallel (or subtracting them from the y value for the upper parallel.) If more accuracy is desired the values of the 4° differences in x and y can be subdivided into 1° units in the same proportion as the 4° lengths of the meridians are subdivided. In this event it is sufficient to use the proportional parts of the standard meridian in subdividing the coordinates of all the meridians, and the following procedure may be used:

Divide each 1° length of the standard meridian by the 4° length of that meridian and multiply the differences of the x and y values of the

ends of each of the other 4° meridians by the corresponding decimal fractions thus obtained. Subtract the resulting x increments for the lower 1° interval from the corresponding x values for the lower parallel; then subtract the x increments for the second 1° interval from the x values just obtained for the parallel 1° above the lower parallel, etc. Follow the same procedure with the y values, except that the increments should be added to the y values of the lower parallel. As the decimal fractions vary but slightly from 0.25, the calculations can be simplified by applying one-fourth of the 4° difference $\mp$ the residual of the decimal fraction, as follows:

$$\frac{\Delta M_2(40°–41°)}{\Delta M_2(40°–44°)}=\frac{111042.242}{444286.870}=0.24993365=\tfrac{1}{4}-0.00006635$$

$$\frac{\Delta M_2(43°–44°)}{\Delta M_2(40°–44°)}=\frac{111101.271}{444286.870}=0.25006652=\tfrac{1}{4}+0.00006652$$

In a map unit lying between latitudes 40° and 44° the maximum difference between subdivision of a 4° meridian into four equal parts and subdivision in true proportion is 1.38 meters in the x value and 0.01 meter in the y value of points along the meridian 3° from the central meridian. These differences can not be plotted on a scale of 1:1,000,000 or even on a scale of 1:500,000. However, in the tables presented with this paper the x values have been computed in direct proportion to the correct subdivision of the standard meridian.

Lallemand's approximate formulas for the rectangular coordinates were developed by him for the x and y coordinates of the central parallel of the projection. The writer has modified these formulas somewhat, and as given below they may be used for the x and y coordinates of any of the parallels on a scale of 1:1,000,000 without introducing serious errors. In these modified formulas for x the five coefficients of cos ϕ apply to the five parallels of the projection, the upper coefficient applying to the upper parallel, etc. $\Delta\lambda$ is taken in degrees from the central meridian. Coordinates for ½° intersections may be computed by taking values of $\Delta\lambda=\frac{1}{2}°$, 1°, 1½°, etc. All values of x and y will be in millimeters on a scale of 1:1,000,000.

$$x(\text{in millimeters})=\Delta\lambda\left[\begin{Bmatrix}111.40\\111.37\\111.33\\111.37\\111.40\end{Bmatrix}\cos\phi-0.08\cos 3\phi\right]\text{----[XXVII]}$$

$$y(\text{in millimeters})=\Delta\lambda^2[0.49\sin 2\phi]\text{----------[XXVIII]}$$

TABLE 1.—*Coordinates for the projection of maps, scale* $\frac{1}{96000}$

Latitude of parallel	Abscissas of developed parallel					Ordinates of developed parallel and meridional distances		
	Longitude interval					Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
	5′	10′	15′	20′	30′			
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
0 00	3.804	7.609	11.413	15.218	22.827			
10	.804	.609	.413	.218	.826			
15	.804	.609	.413	.218	.826	For latitude 0° 5	3.779	0.000
20	.804	.609	.413	.217	.826	10	7.557	.000
30	3.804	7.609	11.413	15.217	22.826	15	11.336	.000
40	.804	.608	.413	.217	.825	20	15.115	.000
45	.804	.608	.412	.216	.825	25	18.893	.000
50	.804	.608	.412	.216	.824	30	22.672	.000
1 00	3.804	7.608	11.412	15.215	22.823			
10	.804	.607	.411	.215	.822			
15	.804	.607	.411	.214	.821	For latitude 1° 5	3.779	0.000
20	.803	.607	.410	.214	.820	10	7.557	.000
30	3.803	7.606	11.409	15.213	22.819	15	11.336	.000
40	.803	.606	.408	.211	.817	20	15.115	.001
45	.803	.605	.408	.211	.816	25	18.893	.001
50	.802	.605	.407	.210	.815	30	22.672	.002
2 00	3.802	7.604	11.407	15.208	22.813			
10	.802	.603	.405	.207	.810			
15	.802	.603	.405	.206	.809	For latitude 2° 5	3.779	0.000
20	.801	.603	.404	.205	.808	10	7.557	.000
30	3.801	7.602	11.403	15.203	22.805	15	11.336	.001
40	.800	.601	.401	.201	.802	20	15.115	.002
45	.800	.600	.400	.200	.800	25	18.894	.002
50	.800	.600	.399	.199	.799	30	22.672	.003
3 00	3.799	7.598	11.398	15.197	22.795			
10	.799	.597	.396	.195	.792			
15	.798	.597	.395	.193	.790	For latitude 3° 5	3.779	0.000
20	.798	.596	.394	.192	.788	10	7.558	.001
30	3.797	7.595	11.392	15.190	22.784	15	11.336	.001
40	.797	.593	.390	.187	.780	20	15.115	.002
45	.796	.593	.389	.185	.778	25	18.894	.004
50	.796	.592	.388	.184	.776	30	22.673	.005
4 00	3.795	7.590	11.386	15.181	22.771			
10	.794	.589	.383	.178	.767			
15	.794	.588	.382	.176	.764	For latitude 4° 5	3.779	0.000
20	.794	.587	.382	.174	.762	10	7.558	.001
30	3.793	7.586	11.378	15.171	22.757	15	11.337	.002
40	.792	.584	.376	.168	.751	20	15.115	.003
45	.791	.583	.374	.166	.749	25	18.894	.005
50	.791	.582	.373	.164	.746	30	22.673	.007
5 00	3.790	7.580	11.370	15.160	22.740			
10	.789	.578	.367	.156	.734			
15	.789	.577	.366	.154	.731	For latitude 5° 5	3.779	0.000
20	.788	.576	.364	.152	.728	10	7.558	.001
30	3.787	7.574	11.361	15.148	22.722	15	11.337	.002
40	.786	.572	.358	.144	.716	20	15.116	.004
45	.785	.571	.356	.142	.712	25	18.895	.006
50	.785	.570	.355	.139	.709	30	22.674	.009
6 00	3.784	7.567	11.351	15.135	22.702			
10	.783	.565	.348	.130	.695			
15	.782	.564	.346	.128	.692	For latitude 6° 5	3.779	0.000
20	.781	.563	.344	.125	.688	10	7.558	.001
30	3.780	7.560	11.340	15.121	22.681	15	11.337	.003
40	.779	.558	.337	.115	.673	20	15.116	.005
45	.778	.556	.335	.113	.669	25	18.896	.007
50	.778	.555	.333	.110	.665	30	22.675	.010
7 00	3.776	7.552	11.329	15.105	22.658			
						For latitude 7° 5	3.779	0.000
						10	7.559	.001
						15	11.338	.003
						20	15.117	.005
						25	18.896	.008
						30	22.676	.012

TABLE 1.—*Coordinates for the projection of maps, scale* $\frac{1}{63360}$—Continued

Latitude of parallel	Abscissas of developed parallel				
	Longitude interval				
	5′	10′	15′	20′	30′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
7 00	3.776	7.552	11.329	15.105	22.658
10	.775	.550	.325	.100	.649
15	.774	.548	.323	.097	.645
20	.774	.547	.321	.094	.641
30	3.772	7.544	11.316	15.088	22.633
40	.771	.541	.312	.083	.624
45	.770	.540	.310	.080	.619
50	.769	.538	.307	.077	.615
8 00	3.768	7.535	11.303	15.071	22.606
10	.766	.532	.298	.064	.597
15	.765	.531	.296	.061	.592
20	.765	.529	.294	.058	.587
30	3.763	7.526	11.289	15.052	22.577
40	.761	.522	.284	.045	.568
45	.760	.521	.281	.042	.563
50	.760	.519	.279	.038	.558
9 00	3.758	7.516	11.274	15.032	22.547
10	.756	.512	.268	.025	.537
15	.755	.511	.266	.021	.532
20	.754	.509	.263	.018	.526
30	3.753	7.505	11.258	15.010	22.516
40	.751	.502	.252	.003	.505
45	.750	.500	.249	14.999	.499
50	.749	.498	.247	.996	.493
10 00	3.747	7.494	11.241	14.988	22.482
10	.745	.490	.235	.980	.470
15	.744	.488	.232	.976	.465
20	.743	.486	.229	.973	.459
30	3.741	7.482	11.223	14.965	22.447
40	.739	.478	.217	.956	.435
45	.738	.476	.214	.952	.429
50	.737	.474	.211	.948	.422
11 00	3.735	7.470	11.205	14.940	22.410
10	.733	.466	.199	.931	.397
15	.732	.464	.195	.927	.391
20	.731	.461	.192	.923	.384
30	3.729	7.457	11.186	14.914	22.371
40	.726	.453	.179	.905	.358
45	.725	.450	.176	.901	.351
50	.724	.448	.172	.896	.345
12 00	3.722	7.444	11.165	14.887	22.331
10	.720	.439	.159	.878	.317
15	.718	.437	.155	.873	.310
20	.717	.434	.152	.869	.303
30	3.715	7.430	11.145	14.859	22.289
40	.712	.425	.137	.850	.275
45	.711	.422	.134	.845	.267
50	.710	.420	.130	.840	.260
13 00	3.708	7.415	11.123	14.830	22.245
10	.705	.410	.115	.820	.230
15	.704	.408	.111	.815	.223
20	.703	.405	.108	.810	.215
30	3.700	7.400	11.100	14.800	22.200
40	.697	.395	.092	.790	.184
45	.696	.392	.088	.784	.177
50	.695	.390	.084	.779	.169
14 00	3.692	7.384	11.077	14.769	22.153

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 7°	5	3.779	0.000
	10	7.559	.001
	15	11.338	.003
	20	15.117	.005
	25	18.896	.008
	30	22.676	.012
For latitude 8°	5	3.779	0.000
	10	7.559	.001
	15	11.338	.003
	20	15.118	.006
	25	18.897	.010
	30	22.677	.014
For latitude 9°	5	3.780	0.000
	10	7.559	.002
	15	11.339	.004
	20	15.119	.007
	25	18.898	.011
	30	22.678	.015
For latitude 10°	5	3.780	0.000
	10	7.560	.002
	15	11.340	.004
	20	15.119	.008
	25	18.899	.012
	30	22.679	.017
For latitude 11°	5	3.780	0.001
	10	7.560	.002
	15	11.340	.005
	20	15.120	.008
	25	18.901	.013
	30	22.681	.019
For latitude 12°	5	3.780	0.001
	10	7.561	.002
	15	11.341	.005
	20	15.122	.009
	25	18.902	.014
	30	22.682	.020
For latitude 13°	5	3.781	0.001
	10	7.561	.002
	15	11.342	.005
	20	15.123	.010
	25	18.903	.015
	30	22.684	.022
For latitude 14°	5	3.781	0.001
	10	7.562	.003
	15	11.343	.006
	20	15.124	.010
	25	18.905	.016
	30	22.686	.023

TABLE 1.—*Coordinates for the projection of maps, scale* $\frac{1}{960000}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		5′	10′	15′	20′	30′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
14	00	3.692	7.384	11.077	14.769	22.153
	10	.689	.379	.068	.758	.137
	15	.688	.376	.064	.752	.129
	20	.687	.374	.060	.747	.121
	30	3.684	7.368	11.052	14.736	22.104
	40	.681	.363	.044	.725	.088
	45	.680	.360	.040	.719	.079
	50	.678	.357	.035	.714	.071
15	00	3.676	7.351	11.027	14.702	22.054
	10	.673	.346	.018	.691	.037
	15	.671	.343	.014	.685	.028
	20	.670	.340	.010	.679	.019
	30	3.667	7.334	11.001	14.668	22.002
	40	.664	.328	10.992	.656	21.984
	45	.662	.325	.987	.650	.975
	50	.661	.322	.983	.644	.966
16	00	3.658	7.316	10.974	14.632	21.948
	10	.655	.310	.965	.620	.930
	15	.653	.307	.960	.614	.920
	20	.652	.304	.956	.607	.911
	30	3.649	7.297	10.946	14.595	21.893
	40	.646	.291	.937	.582	.874
	45	.644	.288	.932	.576	.864
	50	.642	.285	.927	.570	.855
17	00	3.639	7.278	10.918	14.557	21.835
	10	.636	.272	.908	.544	.816
	15	.634	.269	.903	.538	.806
	20	.633	.265	.898	.531	.796
	30	3.629	7.259	10.888	14.518	21.777
	40	.626	.252	.878	.505	.757
	45	.624	.249	.873	.498	.747
	50	.623	.246	.868	.491	.737
18	00	3.619	7.239	10.858	14.478	21.716
	10	.616	.232	.848	.464	.696
	15	.614	.228	.843	.457	.686
	20	.613	.225	.838	.450	.675
	30	3.609	7.218	10.827	14.436	21.654
	40	.606	.211	.817	.422	.633
	45	.604	.208	.811	.415	.623
	50	.602	.204	.806	.408	.612
19	00	3.598	7.197	10.795	14.394	21.591
	10	.595	.190	.785	.379	.569
	15	.593	.186	.779	.372	.558
	20	.591	.182	.774	.365	.547
	30	3.588	7.175	10.763	14.350	21.525
	40	.584	.168	.752	.335	.503
	45	.582	.164	.746	.328	.492
	50	.580	.160	.741	.321	.481
20	00	3.576	7.153	10.729	14.306	21.458
	10	.573	.145	.718	.290	.436
	15	.571	.141	.712	.283	.424
	20	.569	.138	.706	.275	.413
	30	3.565	7.130	10.695	14.260	21.390
	40	.561	.122	.683	.244	.367
	45	.559	.118	.678	.237	.355
	50	.557	.114	.672	.229	.343
21	00	3.553	7.107	10.660	14.213	21.320

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 14°	5	3.781	0.001
	10	7.562	.003
	15	11.343	.006
	20	15.124	.010
	25	18.905	.016
	30	22.686	.023
For latitude 15°	5	3.781	0.001
	10	7.563	.003
	15	11.344	.006
	20	15.125	.011
	25	18.907	.017
	30	22.688	.025
For latitude 16°	5	3.782	0.001
	10	7.563	.003
	15	11.345	.007
	20	15.127	.012
	25	18.908	.018
	30	22.690	.026
For latitude 17°	5	3.782	0.001
	10	7.564	.003
	15	11.346	.007
	20	15.128	.012
	25	18.910	.019
	30	22.692	.028
For latitude 18°	5	3.782	0.001
	10	7.565	.003
	15	11.347	.007
	20	15.130	.013
	25	18.912	.020
	30	22.694	.029
For latitude 19°	5	3.783	0.001
	10	7.566	.003
	15	11.348	.008
	20	15.131	.014
	25	18.914	.021
	30	22.697	.031
For latitude 20°	5	3.783	0.001
	10	7.566	.004
	15	11.350	.008
	20	15.133	.014
	25	18.916	.022
	30	22.700	.032
For latitude 21°	5	3.784	0.001
	10	7.567	.004
	15	11.351	.008
	20	15.135	.015
	25	18.919	.023
	30	22.702	.033

TABLE 1.—*Coordinates for the projection of maps, scale* $\frac{1}{95000}$—Continued

Latitude of parallel	Abscissas of developed parallel					Ordinates of developed parallel and meridional distances		
	Longitude interval					Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
	5′	10′	15′	20′	30′			
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
21 00	3.553	7.107	10.660	14.213	21.320			
10	.549	.099	.648	.197	.296			
15	.547	.095	.642	.189	.284			
20	.545	.091	.636	.181	.272			
30	3.541	7.083	10.624	14.165	21.248			
40	.537	.075	.612	.149	.224			
45	.535	.070	.606	.141	.211			
50	.533	.066	.600	.133	.199			
22 00	3.529	7.058	10.587	14.116	21.174			
10	.525	.050	.575	.100	.150			
15	.523	.046	.569	.091	.137			
20	.521	.042	.562	.083	.125			
30	3.517	7.033	10.550	14.066	21.099			
40	.512	.025	.537	.049	.074			
45	.510	.020	.531	.041	.061			
50	.508	.016	.524	.032	.049			
23 00	3.504	7.008	10.511	14.015	21.023			
10	.499	6.999	.498	13.998	20.997			
15	.497	.995	.492	.989	.984			
20	.495	.990	.485	.981	.971			
30	3.491	6.982	10.472	13.963	20.945			
40	.486	.973	.459	.945	.918			
45	.484	.968	.452	.937	.905			
50	.482	.964	.446	.928	.892			
24 00	3.477	6.955	10.432	13.910	20.865			
10	.473	.946	.419	.892	.838			
15	.471	.941	.412	.883	.824			
20	.468	.937	.405	.874	.811			
30	3.464	6.928	10.392	13.856	20.783			
40	.459	.919	.378	.837	.756			
45	.457	.914	.371	.828	.742			
50	.455	.909	.364	.819	.728			
25 00	3.450	6.900	10.350	13.800	20.700			
10	.445	.891	.336	.782	.672			
15	.443	.886	.329	.772	.658			
20	.441	.881	.322	.763	.644			
30	3.436	6.872	10.308	13.744	20.616			
40	.431	.862	.294	.725	.587			
45	.429	.858	.286	.715	.573			
50	.426	.853	.279	.706	.559			
26 00	3.422	6.843	10.265	13.686	20.530			
10	.417	.834	.250	.667	.501			
15	.414	.829	.243	.657	.486			
20	.412	.824	.236	.648	.471			
30	3.407	6.814	10.221	13.628	20.442			
40	.402	.804	.206	.608	.412			
45	.400	.799	.199	.598	.398			
50	.397	.794	.191	.588	.383			
27 00	3.392	6.784	10.176	13.569	20.353			
10	.387	.774	.161	.548	.323			
15	.385	.769	.154	.538	.308			
20	.382	.764	.146	.528	.292			
30	3.377	6.754	10.131	13.508	20.262			
40	.372	.744	.116	.488	.231			
45	.369	.739	.108	.477	.216			
50	.367	.734	.100	.467	.201			
28 00	3.362	6.723	10.085	13.446	20.170			

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 21°	5	3.784	0.001
	10	7.567	.004
	15	11.351	.008
	20	15.135	.015
	25	18.919	.023
	30	22.702	.033
For latitude 22°	5	3.704	0.001
	10	7.568	.004
	15	11.352	.009
	20	15.137	.015
	25	18.921	.024
	30	22.705	.035
For latitude 23°	5	3.785	0.001
	10	7.569	.004
	15	11.354	.009
	20	15.138	.016
	25	18.923	.025
	30	22.708	.036
For latitude 24°	5	3.785	0.001
	10	7.570	.004
	15	11.355	.009
	20	15.140	.016
	25	18.926	.026
	30	22.711	.037
For latitude 25°	5	3.786	0.001
	10	7.571	.004
	15	11.357	.010
	20	15.142	.017
	25	18.928	.026
	30	22.714	.038
For latitude 26°	5	3.786	0.001
	10	7.572	.004
	15	11.358	.010
	20	15.144	.017
	25	18.930	.027
	30	22.716	.039
For latitude 27°	5	3.787	0.001
	10	7.573	.004
	15	11.360	.010
	20	15.147	.018
	25	18.934	.028
	30	22.720	.040
For latitude 28°	5	3.787	0.001
	10	7.574	.005
	15	11.362	.010
	20	15.149	.018
	25	18.936	.029
	30	22.724	.041

TABLE 1.—*Coordinates for the projection of maps, scale* $\frac{1}{9600}$—Continued

Latitude of parallel	Abscissas of developed parallel				
	Longitude interval				
	5′	10′	15′	20′	30′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
28 00	3.362	6.723	10.085	13.446	20.170
10	.356	.713	.069	.426	.139
15	.354	.708	.061	.415	.123
20	.351	.702	.054	.405	.107
30	3.346	6.692	10.038	13.384	20.076
40	.341	.681	.022	.363	.044
45	.338	.676	.014	.352	.028
50	.335	.671	10.006	.342	20.012
29 00	3.330	6.660	9.990	13.320	19.980
10	.325	.649	.974	.299	.948
15	.322	.644	.966	.288	.932
20	.319	.639	.958	.277	.916
30	3.314	6.628	9.942	13.256	19.884
40	.308	.617	.925	.234	.851
45	.306	.611	.917	.223	.835
50	.303	.606	.909	.212	.818
30 00	3.298	6.595	9.893	13.190	19.785
10	.292	.584	.876	.168	.752
15	.289	.578	.868	.157	.735
20	.286	.573	.859	.146	.719
30	3.281	6.562	9.843	13.123	19.685
40	.275	.551	.826	.101	.652
45	.272	.545	.817	.090	.635
50	.270	.539	.809	.078	.618
31 00	3.264	6.528	9.792	13.056	19.584
10	.258	.517	.775	.033	.550
15	.255	.511	.766	.022	.532
20	.253	.505	.758	13.010	.515
30	3.247	6.494	9.740	12.987	19.481
40	.241	.482	.723	.964	.446
45	.238	.476	.714	.953	.429
50	.235	.470	.706	.941	.411
32 00	3.229	6.459	9.688	12.918	19.376
10	.224	.447	.671	.894	.341
15	.221	.441	.662	.882	.324
20	.218	.435	.653	.871	.307
30	3.212	6.424	9.635	12.847	19.271
40	.206	.412	.617	.823	.235
45	.203	.406	.608	.811	.217
50	.200	.400	.600	.799	.199
33 00	3.194	6.388	9.582	12.775	19.163
10	.188	.376	.564	.751	.127
15	.185	.370	.554	.739	.109
20	.182	.364	.545	.727	.091
30	3.176	6.351	9.527	12.703	19.054
40	.170	.339	.509	.679	19.018
45	.167	.333	.500	.666	18.999
50	.164	.327	.491	.654	.981
34 00	3.157	6.315	9.472	12.629	18.944
10	.151	.302	.453	.605	.907
15	.148	.296	.444	.592	.888
20	.145	.290	.435	.580	.870
30	3.139	6.277	9.416	12.555	18.832
40	.132	.265	.397	.530	.795
45	.129	.259	.388	.517	.776
50	.126	.252	.379	.505	.757
35 00	3.120	6.240	9.360	12.480	18.719

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 28°	5	3.787	0.001
	10	7.574	.005
	15	11.362	.010
	20	15.149	.018
	25	18.936	.029
	30	22.724	.041
For latitude 29°	5	3.788	0.001
	10	7.576	.005
	15	11.363	.011
	20	15.151	.019
	25	18.939	.029
	30	22.727	.042
For latitude 30°	5	3.788	0.001
	10	7.577	.005
	15	11.365	.011
	20	15.154	.019
	25	18.942	.030
	30	22.731	.043
For latitude 31°	5	3.789	0.001
	10	7.578	.005
	15	11.367	.011
	20	15.156	.020
	25	18.945	.031
	30	22.734	.044
For latitude 32°	5	3.789	0.001
	10	7.579	.005
	15	11.369	.011
	20	15.158	.020
	25	18.948	.031
	30	22.738	.045
For latitude 33°	5	3.790	0.001
	10	7.580	.005
	15	11.370	.011
	20	15.161	.020
	25	18.951	.032
	30	22.741	.046
For latitude 34°	5	3.791	0.001
	10	7.582	.005
	15	11.372	.012
	20	15.163	.021
	25	18.954	.032
	30	22.745	.046
For latitude 35°	5	3.791	0.001
	10	7.583	.005
	15	11.374	.012
	20	15.166	.021
	25	18.957	.033
	30	22.749	.047

TABLE 1.—*Coordinates for the projection of maps, scale* $\frac{1}{63360}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		5′	10′	15′	20′	30′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
35	00	3.120	6.240	9.360	12.480	18.719
	10	.114	.227	.341	.454	.681
	15	.110	.221	.331	.441	.662
	20	.107	.214	.321	.429	.643
	30	3.101	6.202	9.302	12.403	18.605
	40	.094	.189	.283	.377	.566
	45	.091	.182	.273	.365	.547
	50	.088	.176	.264	.352	.528
36	00	3.081	6.163	9.244	12.326	18.489
	10	.075	.150	.225	.300	.450
	15	.072	.143	.215	.287	.430
	20	.068	.137	.205	.274	.411
	30	3.062	6.124	9.186	12.248	18.371
	40	.055	.111	.166	.221	.332
	45	.052	.104	.156	.208	.312
	50	.049	.097	.146	.195	.292
37	00	3.042	6.084	9.126	12.168	18.252
	10	.035	.071	.106	.142	.213
	15	.032	.064	.096	.128	.193
	20	.029	.057	.086	.115	.172
	30	3.022	6.044	9.066	12.088	18.132
	40	.015	.031	.046	.061	.092
	45	.012	.024	.036	.048	.072
	50	.009	.017	.026	.034	.051
38	00	3.002	6.004	9.005	12.007	18.011
	10	2.995	5.990	8.985	11.980	17.970
	15	.992	.983	.975	.996	.949
	20	.988	.976	.964	.953	.929
	30	2.982	5.963	8.944	11.925	17.888
	40	.974	.949	.923	.898	.846
	45	.971	.942	.913	.884	.826
	50	.968	.935	.903	.870	.805
39	00	2.961	5.921	8.882	11.842	17.763
	10	.954	.907	.861	.814	.722
	15	.950	.900	.850	.800	.701
	20	.947	.893	.840	.786	.680
	30	2.940	5.879	8.819	11.758	17.638
	40	.933	.865	.798	.730	.595
	45	.929	.858	.787	.716	.574
	50	.926	.851	.777	.702	.553
40	00	2.918	5.837	8.755	11.674	17.511
	10	.911	.823	.734	.645	.468
	15	.908	.816	.723	.631	.447
	20	.904	.808	.713	.617	.425
	30	2.897	5.794	8.691	11.588	17.382
	40	.890	.780	.670	.559	.339
	45	.886	.773	.659	.545	.318
	50	.883	.765	.648	.531	.296
41	00	2.875	5.751	8.626	11.502	17.253
	10	.868	.736	.605	.473	.209
	15	.864	.729	.594	.458	.187
	20	.861	.722	.583	.444	.165
	30	2.854	5.707	8.561	11.414	17.122
	40	.846	.692	.539	.385	.078
	45	.843	.685	.528	.370	.056
	50	.839	.678	.517	.356	.033
42	00	2.832	5.663	8.495	11.326	16.989

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 35°	5	3.791	0.001
	10	7.583	.005
	15	11.374	.012
	20	15.166	.021
	25	18.957	.033
	30	22.749	.047
For latitude 36°	5	3.792	0.001
	10	7.584	.005
	15	11.376	.012
	20	15.168	.021
	25	18.961	.033
	30	22.752	.047
For latitude 37°	5	3.793	0.001
	10	7.585	.005
	15	11.378	.012
	20	15.171	.021
	25	18.964	.033
	30	22.757	.048
For latitude 38°	5	3.793	0.001
	10	7.587	.005
	15	11.380	.012
	20	15.173	.021
	25	18.967	.034
	30	22.761	.048
For latitude 39°	5	3.794	0.001
	10	7.588	.005
	15	11.382	.012
	20	15.176	.022
	25	18.970	.034
	30	22.765	.049
For latitude 40°	5	3.795	0.001
	10	7.589	.005
	15	11.384	.012
	20	15.179	.022
	25	18.974	.034
	30	22.768	.049
For latitude 41°	5	3.795	0.001
	10	7.591	.005
	15	11.386	.012
	20	15.181	.022
	25	18.977	.034
	30	22.772	.049
For latitude 42°	5	3.796	0.001
	10	7.592	.005
	15	11.388	.012
	20	15.184	.022
	25	18.980	.034
	30	22.776	.050

TABLE 1.—*Coordinates for the projection of maps, scale* $\frac{1}{96000}$—Continued

Latitude of parallel	Abscissas of developed parallel				
	Longitude interval				
	5′	10′	15′	20′	30′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
42 00	2.832	5.663	8.495	11.326	16.989
10	.824	.648	.472	.297	.945
15	.820	.641	.461	.282	.923
20	.817	.633	.450	.267	.900
30	2.809	5.619	8.428	11.237	16.856
40	.802	.604	.405	.207	.811
45	.798	.596	.394	.192	.788
50	.794	.589	.383	.177	.766
43 00	2.787	5.574	8.360	11.147	16.721
10	.779	.558	.338	.117	.675
15	.775	.551	.326	.102	.653
20	.772	.543	.315	.087	.630
30	2.764	5.528	8.292	11.056	16.584
40	.756	.513	.269	.026	.539
45	.753	.505	.258	11.011	.516
50	.749	.498	.246	10.995	.493
44 00	2.741	5.482	8.223	10.965	16.447
10	.733	.467	.200	.334	.401
15	.730	.459	.189	.918	.378
20	.726	.452	.177	.903	.355
30	2.718	5.436	8.154	10.872	16.308
40	.710	.421	.131	.841	.262
45	.706	.413	.119	.826	.238
50	.703	.405	.108	.810	.215
45 00	2.695	5.389	8.084	10.779	16.168
10	.687	.374	.061	.747	.121
15	.683	.366	.049	.732	.098
20	.679	.358	.037	.716	.074
30	2.671	5.342	8.014	10.685	16.027
40	.663	.327	7.990	.653	15.980
45	.659	.319	.978	.637	.956
50	.655	.311	.966	.621	.932
46 00	2.647	5.295	7.942	10.590	15.884
10	.639	.279	.918	.558	.837
15	.635	.271	.906	.542	.813
20	.631	.263	.894	.526	.789
30	2.623	5.247	7.870	10.494	15.741
40	.615	.231	.846	.462	.693
45	.611	.223	.834	.446	.669
50	.607	.215	.822	.430	.644
47 00	2.599	5.199	7.798	10.397	15.596
10	.591	.182	.774	.365	.547
15	.587	.174	.762	.349	.523
20	.583	.166	.749	.332	.499
30	2.575	5.150	7.725	10.300	15.450
40	.567	.134	.700	.267	.401
45	.563	.125	.688	.251	.376
50	.559	.117	.676	.235	.352
48 00	2.550	5.101	7.651	10.202	15.303
10	.542	.084	.627	.169	.253
15	.538	.076	.614	.152	.228
20	.534	.068	.602	.136	.204
30	2.526	5.051	7.577	10.103	15.154
40	.517	.035	.552	.070	.104
45	.513	.026	.540	.053	.079
50	.509	.018	.527	.036	.055
49 00	2.501	5.001	7.502	10.003	15.005

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 42°	5	3.796	0.001
	10	7.592	.005
	15	11.388	.012
	20	15.184	.022
	25	18.980	.034
	30	22.776	.050
For latitude 43°	5	3.797	0.001
	10	7.593	.006
	15	11.390	.012
	20	15.187	.022
	25	18.984	.035
	30	22.781	.050
For latitude 44°	5	3.797	0.001
	10	7.595	.006
	15	11.392	.012
	20	15.189	.022
	25	18.987	.035
	30	22.785	.050
For latitude 45°	5	3.798	0.001
	10	7.596	.006
	15	11.394	.012
	20	15.192	.022
	25	18.990	.035
	30	22.789	.050
For latitude 46°	5	3.799	0.001
	10	7.597	.006
	15	11.396	.012
	20	15.195	.022
	25	18.994	.035
	30	22.793	.050
For latitude 47°	5	3.799	0.001
	10	7.599	.006
	15	11.398	.012
	20	15.198	.022
	25	18.997	.035
	30	22.797	.050
For latitude 48°	5	3.800	0.001
	10	7.600	.005
	15	11.400	.012
	20	15.200	.022
	25	19.000	.034
	30	22.801	.050
For latitude 49°	5	3.801	0.001
	10	7.601	.005
	15	11.402	.012
	20	15.203	.022
	25	19.004	.034
	30	22.805	.049

TABLE 1.—*Coordinates for the projection of maps, scale* $\frac{1}{63360}$—Continued

Latitude of parallel	Abscissas of developed parallel				
	Longitude interval				
	5′	10′	15′	20′	30′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
49 00	2.501	5.001	7.502	10.003	15.005
10	.492	4.985	.477	9.970	14.954
15	.488	.976	.465	.953	.929
20	.484	.968	.452	.936	.904
30	2.476	4.951	7.427	9.902	14.854
40	.467	.934	.402	.869	.803
45	.463	.926	.389	.852	.778
50	.459	.918	.376	.835	.753
50 00	2.450	4.901	7.351	9.801	14.702
10	.442	.884	.326	.767	.651
15	.438	.875	.313	.750	.625
20	.433	.867	.300	.733	.600
30	2.425	4.850	7.274	9.699	14.549
40	.416	.833	.249	.665	.498
45	.412	.824	.236	.648	.472
50	.408	.815	.223	.631	.446
51 00	2.399	4.798	7.197	9.596	14.395
10	.391	.781	.172	.562	.343
15	.386	.772	.159	.545	.317
20	.382	.764	.146	.528	.291
30	2.373	4.746	7.120	9.493	14.239
40	.365	.729	.094	.458	.187
45	.360	.720	.081	.441	.161
50	.356	.712	.068	.424	.135
52 00	2.347	4.694	7.042	9.389	14.083
10	.338	.677	.015	.353	.031
15	.334	.668	7.002	.336	14.004
20	.330	.659	6.989	.319	13.978
30	2.321	4.642	6.963	9.284	13.926
40	.312	.624	.936	.249	.873
45	.308	.615	.923	.231	.846
50	.303	.607	.910	.213	.820
53 00	2.295	4.589	6.884	9.178	13.767
10	.286	.571	.857	.143	.714
15	.281	.562	.844	.125	.687
20	.277	.554	.830	.107	.661
30	2.268	4.536	6.804	9.072	13.607
40	.259	.518	.777	.036	.554
45	.255	.509	.764	.018	.527
50	.250	.500	.750	9.000	.500
54 00	2.241	4.482	6.723	8.965	13.447
10	.232	.464	.697	.929	.393
15	.228	.455	.683	.911	.366
20	.223	.446	.670	.893	.339
30	2.214	4.428	6.643	8.857	13.285
40	.205	.410	.616	.821	.231
45	.201	.401	.602	.803	.204
50	.196	.392	.588	.785	.177
55 00	2.187	4.374	6.561	8.748	13.122
10	.178	.356	.534	.712	.068
15	.173	.347	.520	.694	.041
20	.169	.338	.507	.676	13.013
30	2.160	4.320	6.479	8.639	12.959
40	.151	.301	.452	.603	.904
45	.146	.292	.438	.584	.877
50	.142	.283	.425	.566	.849
56 00	2.132	4.265	6.397	8.529	12.794

Ordinates of developed parallel and meridional distances		
Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
′	*Inches*	*Inch*
For latitude 49°: 5	3.801	0.001
10	7.601	.005
15	11.402	.012
20	15.203	.022
25	19.004	.034
30	22.805	.049
For latitude 50°: 5	3.801	0.001
10	7.603	.005
15	11.404	.012
20	15.206	.022
25	19.007	.034
30	22.809	.049
For latitude 51°: 5	3.802	0.001
10	7.604	.005
15	11.406	.012
20	15.208	.022
25	19.011	.034
30	22.813	.049
For latitude 52°: 5	3.803	0.001
10	7.605	.005
15	11.408	.012
20	15.211	.022
25	19.014	.034
30	22.817	.048
For latitude 53°: 5	3.803	0.001
10	7.607	.005
15	11.410	.012
20	15.214	.021
25	19.017	.033
30	22.821	.048
For latitude 54°: 5	3.804	0.001
10	7.608	.005
15	11.412	.012
20	15.216	.021
25	19.020	.033
30	22.824	.047
For latitude 55°: 5	3.805	0.001
10	7.609	.005
15	11.414	.012
20	15.219	.021
25	19.024	.033
30	22.828	.047
For latitude 56°: 5	3.805	0.001
10	7.611	.005
15	11.416	.012
20	15.221	.021
25	19.027	.032
30	22.832	.046

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{48000}$

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		2½′	5′	7½′	10′	15′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
0	00	3.804	7.609	11.413	15.218	22.827
	05	.804	.609	.413	.218	.827
	07½	.804	.609	.413	.218	.826
	10	.804	.609	.413	.218	.826
	15	3.804	7.609	11.413	15.218	22.826
	20	.804	.609	.413	.217	.826
	22½	.804	.609	.413	.217	.826
	25	.804	.609	.413	.217	.826
	30	3.804	7.609	11.413	15.217	22.826
	35	.804	.608	.413	.217	.825
	37½	.804	.608	.413	.217	.825
	40	.804	.608	.413	.217	.825
	45	3.804	7.608	11.412	15.216	22.825
	50	.804	.608	.412	.216	.824
	52½	.804	.608	.412	.216	.824
	55	.804	.608	.412	.216	.824
1	00	3.804	7.608	11.412	15.215	22.823
	05	.804	.608	.411	.215	.822
	07½	.804	.607	.411	.215	.822
	10	.804	.607	.411	.215	.822
	15	3.804	7.607	11.411	15.214	22.821
	20	.803	.607	.410	.214	.820
	22½	.803	.607	.410	.213	.820
	25	.803	.607	.410	.213	.820
	30	3.803	7.606	11.409	15.213	22.819
	35	.803	.606	.409	.212	.818
	37½	.803	.606	.409	.212	.817
	40	.803	.606	.408	.211	.817
	45	3.803	7.605	11.408	15.211	22.816
	50	.802	.605	.407	.210	.815
	52½	.802	.605	.407	.210	.814
	55	.802	.605	.407	.209	.814
2	00	3.802	7.604	11.407	15.208	22.813
	05	.802	.604	.406	.208	.812
	07½	.802	.604	.405	.207	.811
	10	.802	.603	.405	.207	.810
	15	3.802	7.603	11.405	15.206	22.809
	20	.801	.603	.404	.205	.808
	22½	.801	.602	.404	.205	.807
	25	.801	.602	.403	.204	.806
	30	3.801	7.602	11.403	15.203	22.805
	35	.801	.601	.402	.202	.803
	37½	.800	.601	.401	.202	.803
	40	.800	.601	.401	.201	.802
	45	3.800	7.600	11.400	15.200	22.800
	50	.800	.600	.399	.199	.799
	52½	.800	.599	.399	.199	.798
	55	.799	.599	.398	.198	.797
3	00	3.799	7.598	11.398	15.197	22.795

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 0°	2½	3.779	0.000
	5	7.557	.000
	7½	11.336	.000
	10	15.115	.000
	12½	18.893	.000
	15	22.672	.000
For latitude 1°	2½	3.779	0.000
	5	7.557	.000
	7½	11.336	.000
	10	15.115	.000
	12½	18.893	.001
	15	22.672	.001
For latitude 2°	2½	3.779	0.000
	5	7.557	.000
	7½	11.336	.000
	10	15.115	.001
	12½	18.894	.001
	15	22.672	.002
For latitude 3°	2½	3.779	0.000
	5	7.558	.000
	7½	11.336	.001
	10	15.115	.001
	12½	18.894	.002
	15	22.673	.003

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{48000}$—Continued

Latitude of parallel	Abscissas of developed parallel				
	Longitude interval				
	2½′	5′	7½′	10′	15′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
3 00	3.799	7.598	11.398	15.197	22.795
05	.799	.598	.397	.196	.794
07½	.799	.598	.396	.195	.793
10	.799	.597	.396	.195	.792
15	3.798	7.597	11.395	15.193	22.790
20	.798	.596	.394	.192	.788
22½	.798	.596	.394	.191	.787
25	.798	.595	.393	.191	.786
30	3.797	7.595	11.392	15.190	22.784
35	.797	.594	.391	.188	.782
37½	.797	.594	.391	.187	.781
40	.797	.593	.390	.187	.780
45	3.796	7.593	11.389	15.185	22.778
50	.796	.592	.388	.184	.776
52½	.796	.592	.387	.183	.775
55	.796	.591	.387	.182	.774
4 00	3.795	7.590	11.386	15.181	22.771
05	.795	.590	.385	.179	.769
07½	.795	.589	.384	.179	.768
10	.794	.589	.383	.178	.767
15	3.794	7.588	11.382	15.176	22.764
20	.794	.587	.382	.174	.762
22½	.793	.587	.380	.174	.760
25	.793	.586	.380	.173	.759
30	3.793	7.586	11.378	15.171	22.757
35	.792	.585	.377	.169	.754
37½	.792	.584	.376	.168	.573
40	.792	.584	.376	.168	.751
45	3.791	7.583	11.374	15.166	22.749
50	.791	.582	.373	.164	.746
52½	.791	.582	.372	.163	.745
55	.791	.581	.372	.162	.743
5 00	3.790	7.580	11.370	15.160	22.740
05	.790	.579	.369	.158	.737
07½	.789	.579	.368	.157	.736
10	.789	.578	.367	.156	.734
15	3.789	7.577	11.366	15.154	22.731
20	.788	.576	.364	.152	.728
22½	.788	.576	.363	.151	.727
25	.788	.575	.363	.150	.725
30	3.787	7.574	11.361	15.148	22.722
35	.786	.573	.359	.146	.719
37½	.786	.572	.359	.145	.717
40	.786	.572	.358	.144	.716
45	3.785	7.571	11.356	15.142	22.712
50	.785	.570	.355	.139	.709
52½	.785	.570	.354	.138	.707
55	.784	.569	.353	.137	.706
6 00	3.784	7.567	11.351	15.135	22.702

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 3°	2½	3.779	0.000
	5	7.558	.000
	7½	11.336	.001
	10	15.115	.001
	12½	18.894	.002
	15	22.673	.003
For latitude 4°	2½	3.779	0.000
	5	7.558	.000
	7½	11.337	.001
	10	15.115	.002
	12½	18.894	.002
	15	22.673	.003
For latitude 5°	2½	3.779	0.000
	5	7.558	.000
	7½	11.337	.001
	10	15.116	.002
	12½	18.895	.003
	15	22.674	.004
For latitude 6°	2½	3.779	0.000
	5	7.558	.001
	7½	11.337	.001
	10	15.116	.002
	12½	18.896	.004
	15	22.675	.005

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{48000}$—Continued

Latitude of parallel	Abscissas of developed parallel				
	Longitude interval				
	2½′	5′	7½′	10′	15′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
6 00	3.784	7.567	11.351	15.135	22.702
05	.783	.566	.349	.133	.699
07½	.783	.566	.349	.131	.697
10	.783	.565	.348	.130	.695
15	3.782	7.564	11.346	15.128	22.692
20	.781	.563	.344	.125	.688
22½	.781	.562	.343	.124	.686
25	.781	.561	.342	.123	.685
30	3.780	7.560	11.340	15.121	22.681
35	.779	.559	.338	.118	.677
37½	.779	.558	.338	.117	.675
40	.779	.558	.337	.115	.673
45	3.778	7.556	11.335	15.113	22.669
50	.778	.555	.333	.110	.665
52½	.777	.554	.332	.109	.664
55	.777	.554	.331	.108	.662
7 00	3.776	7.552	11.329	15.105	22.658
05	.776	.551	.327	.102	.653
07½	.775	.550	.326	.101	.651
10	.775	.550	.325	.100	.649
15	3.774	7.548	11.323	15.097	22.645
20	.774	.547	.321	.094	.641
22½	.773	.546	.319	.093	.639
25	.773	.546	.318	.091	.637
30	3.772	7.544	11.316	15.088	22.633
35	.771	.543	.314	.085	.628
37½	.771	.542	.313	.084	.626
40	.771	.541	.312	.083	.624
45	3.770	7.540	11.310	15.080	22.619
50	.769	.538	.307	.077	.615
52½	.769	.538	.306	.075	.613
55	.768	.537	.305	.074	.610
8 00	3.768	7.535	11.303	15.071	22.606
05	.767	.534	.301	.068	.601
07½	.766	.533	.299	.066	.599
10	.766	.532	.298	.064	.597
15	3.765	7.531	11.296	15.061	22.592
20	.765	.529	.294	.058	.587
22½	.764	.528	.292	.056	.585
25	.764	.527	.291	.055	.582
30	3.763	7.526	11.289	15.052	22.577
35	.762	.524	.286	.048	.573
37½	.762	.523	.285	.047	.570
40	.761	.522	.284	.045	.568
45	3.760	7.521	11.281	15.042	22.563
50	.760	.519	.279	.038	.558
52½	.759	.518	.277	.037	.555
55	.758	.517	.276	.035	.553
9 00	3.758	7.516	11.274	15.032	22.547

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 6°	2½	3.779	0.000
	5	7.558	.001
	7½	11.337	.001
	10	15.116	.002
	12½	18.896	.004
	15	22.675	.005
For latitude 7°	2½	3.779	0.000
	5	7.559	.001
	7½	11.338	.001
	10	15.117	.003
	12½	18.896	.004
	15	22.676	.006
For latitude 8°	2½	3.779	0.000
	5	7.559	.001
	7½	11.338	.002
	10	15.118	.003
	12½	18.897	.005
	15	22.677	.007
For latitude 9°	2½	3.780	0.000
	5	7.559	.001
	7½	11.339	.002
	10	15.118	.003
	12½	18.898	.005
	15	22.678	.008

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{48000}$—Continued

Latitude of parallel	Abscissas of developed parallel				
	Longitude interval				
	2½′	5′	7½′	10′	15′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
9 00	3.758	7.516	11.274	15.032	22.547
05	.757	.514	.271	.028	.542
07½	.757	.513	.270	.026	.540
10	.756	.512	.268	.025	.537
15	3.755	7.511	11.266	15.021	22.532
20	.754	.509	.263	.018	.526
22½	.754	.508	.262	.016	.524
25	.753	.507	.260	.014	.521
30	3.753	7.505	11.258	15.010	22.516
35	.752	.503	.255	.007	.510
37½	.751	.502	.254	.005	.507
40	.751	.502	.252	.003	.505
45	3.750	7.500	11.249	14.999	22.499
50	.749	.498	.247	.996	.493
52½	.748	.497	.245	.994	.491
55	.748	.496	.244	.992	.488
10 00	3.747	7.494	11.241	14.988	22.482
05	.746	.492	.238	.984	.476
07½	.746	.491	.237	.982	.473
10	.745	.490	.235	.980	.470
15	3.744	7.488	11.232	14.976	22.465
20	.743	.486	.229	.973	.459
22½	.743	.485	.228	.971	.456
25	.742	.484	.226	.969	.453
30	3.741	7.482	11.223	14.965	22.447
35	.740	.480	.220	.961	.441
37½	.740	.479	.219	.959	.438
40	.739	.478	.217	.956	.435
45	3.738	7.476	11.214	14.952	22.429
50	.737	.474	.211	.948	.422
52½	.737	.473	.210	.946	.419
55	.736	.472	.208	.944	.416
11 00	3.735	7.470	11.205	14.940	22.410
05	.734	.468	.202	.936	.404
07½	.733	.467	.200	.934	.400
10	.733	.466	.199	.931	.397
15	3.732	7.464	11.195	14.927	22.391
20	.731	.461	.192	.923	.384
22½	.730	.460	.191	.921	.381
25	.730	.459	.189	.919	.378
30	3.729	7.457	11.186	14.914	22.371
35	.727	.455	.182	.910	.365
37½	.727	.454	.181	.908	.361
40	.726	.453	.179	.905	.358
45	3.725	7.450	11.176	14.901	22.351
50	.724	.448	.172	.896	.345
52½	.724	.447	.171	.894	.341
55	.723	.446	.169	.892	.338
12 00	3.722	7.444	11.165	14.887	22.331

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 9°	2½	3.780	0.000
	5	7.559	.001
	7½	11.339	.002
	10	15.118	.003
	12½	18.898	.005
	15	22.678	.008
For latitude 10°	2½	3.780	0.000
	5	7.560	.001
	7½	11.340	.002
	10	15.119	.004
	12½	18.899	.006
	15	22.679	.009
For latitude 11°	2½	3.780	0.000
	5	7.560	.001
	7½	11.340	.002
	10	15.120	.004
	12½	18.901	.006
	15	22.681	.009
For latitude 12°	2½	3.780	0.000
	5	7.561	.001
	7½	11.341	.003
	10	15.121	.005
	12½	18.902	.007
	15	11.682	.010

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{4800}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		2½′	5′	7½′	10′	15′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
12	00	3.722	7.444	11.165	14.887	22.331
	05	.721	.441	.162	.883	.324
	07½	.720	.440	.160	.880	.321
	10	.720	.439	.159	.878	.317
	15	3.718	7.437	11.155	14.873	22.310
	20	.717	.434	.152	.869	.303
	22½	.717	.433	.150	.866	.300
	25	.716	.432	.148	.864	.296
	30	3.715	7.430	11.145	14.859	22.289
	35	.714	.427	.141	.855	.282
	37½	.713	.426	.139	.852	.278
	40	.712	.425	.137	.850	.275
	45	3.711	7.422	11.134	14.845	22.267
	50	.710	.420	.130	.840	.260
	52½	.709	.419	.128	.838	.256
	55	.709	.418	.126	.835	.253
13	00	3.708	7.415	11.123	14.830	22.245
	05	.706	.413	.119	.825	.238
	07½	.706	.411	.117	.823	.234
	10	.705	.410	.115	.820	.230
	15	3.704	7.408	11.111	14.815	22.223
	20	.703	.405	.108	.810	.215
	22½	.702	.404	.106	.808	.211
	25	.701	.403	.104	.805	.208
	30	3.700	7.400	11.100	14.800	22.200
	35	.699	.397	.096	.795	.192
	37½	.698	.396	.094	.792	.188
	40	.697	.395	.092	.790	.184
	45	3.696	7.392	11.088	14.784	22.177
	50	.695	.390	.084	.779	.169
	52½	.694	.388	.082	.777	.165
	55	.693	.387	.080	.774	.161
14	00	3.692	7.384	11.077	14.769	22.153
	05	.691	.382	.072	.763	.145
	07½	.690	.380	.070	.761	.141
	10	.689	.379	.068	.758	.137
	15	3.688	7.376	11.064	14.752	22.129
	20	.687	.374	.060	.747	121
	22½	.686	.372	.058	.744	.116
	25	.685	.371	.056	.742	.112
	30	3.684	7.368	11.052	14.736	22.104
	35	.683	.365	.048	.731	.096
	37½	.682	.364	.046	.728	.092
	40	.681	.363	.044	.725	.088
	45	3.680	7.360	11.040	14.719	22.079
	50	.678	.357	.035	.714	.071
	52½	.670	.356	.033	.711	.066
	55	.677	.354	.031	.708	.062
15	00	3.676	7.351	11.027	14.702	22.054

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 12°	2½	3.780	0.000
	5	7.561	.001
	7½	11.341	.003
	10	15.121	.005
	12½	18.902	.007
	15	22.682	.010
For latitude 13°	2½	3.781	0.000
	5	7.561	.001
	7½	11.342	.003
	10	15.123	.005
	12½	18.903	.008
	15	22.684	.011
For latitude 14°	2½	3.781	0.000
	5	7.562	.001
	7½	11.343	.003
	10	15.124	.005
	12½	18.905	.008
	15	22.686	.012
For latitude 15°	2½	3.781	0.000
	5	7.562	.001
	7½	11.344	.003
	10	15.125	.006
	12½	18.907	.009
	15	22.688	.012

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{45000}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		2½′	5′	7½′	10′	15′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
15	00	3.676	7.351	11.027	14.702	22.054
	05	.674	.348	.023	.697	.045
	07½	.673	.347	.020	.694	.041
	10	.673	.346	.018	.691	.037
	15	3.671	7.343	11.014	14.685	22.028
	20	.670	.340	.010	.679	.019
	22½	.669	.338	.007	.677	.015
	25	.668	.337	.005	.674	.010
	30	3.667	7.334	11.001	14.668	22.002
	35	.665	.331	10.996	.662	21.993
	37½	.665	.329	.994	.659	.988
	40	.664	.328	.992	.656	.984
	45	3.662	7.325	10.987	14.650	21.975
	50	.661	.322	.983	.644	.966
	52½	.660	.320	.981	.641	.962
	55	.659	.319	.978	.638	.957
16	00	3.658	7.316	10.974	14.632	21.948
	05	.656	.313	.969	.626	.939
	07½	.656	.311	.967	.623	.934
	10	.655	.310	.965	.620	.930
	15	3.653	7.307	10.960	14.614	21.920
	20	.652	.304	.956	.607	.911
	22½	.651	.302	.953	.604	.907
	25	.650	.301	.951	.601	.902
	30	3.649	7.297	10.946	14.595	21.893
	35	.647	.294	.942	.589	.883
	37½	.646	.293	.939	.586	.878
	40	.646	.291	.937	.582	.874
	45	3.644	7.288	10.932	14.576	21.864
	50	.642	.285	.927	.570	.855
	52½	.642	.283	.925	.567	.850
	55	.641	.282	.922	.563	.845
17	00	3.639	7.278	10.918	14.557	21.835
	05	.638	.275	.913	.551	.826
	07½	.637	.274	.910	.547	.821
	10	.636	.272	.908	.544	.816
	15	3.634	7.269	10.903	14.538	21.806
	20	.633	.265	.898	.531	.796
	22½	.632	.264	.896	.528	.792
	25	.631	.262	.893	.524	.787
	30	3.629	7.259	10.888	14.518	21.777
	35	.628	.256	.883	.511	.767
	37½	.627	.254	.881	.508	.762
	40	.626	.252	.878	.505	.757
	45	3.624	7.249	10.873	14.498	21.747
	50	.623	.246	.868	.491	.737
	52½	.622	.244	.866	.488	.732
	55	.621	.242	.863	.484	.727
18	00	3.619	7.239	10.858	14.478	21.716

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 15°	2½	3.781	0.000
	5	7.562	.001
	7½	11.344	.003
	10	15.125	.006
	12½	18.907	.009
	15	22.688	.012
For latitude 16°	2½	3.782	0.000
	5	7.563	.001
	7½	11.345	.003
	10	15.126	.006
	12½	18.908	.009
	15	22.690	.013
For latitude 17°	2½	3.782	0.000
	5	7.564	.002
	7½	11.346	.003
	10	15.128	.006
	12½	18.910	.010
	15	22.692	.014
For latitude 18°	2½	3.782	0.000
	5	7.565	.002
	7½	11.347	.004
	10	15.129	.006
	12½	18.912	.010
	15	22.694	.015

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{48000}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		2½′	5′	7½′	10′	15′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
18	00	3.619	7.239	10.858	14.478	21.716
	05	.618	.235	.853	.471	.706
	07½	.617	.234	.850	.467	.701
	10	.616	.232	.848	.464	.696
	15	3.614	7.228	10.843	14.457	21.686
	20	.613	.225	.838	.450	.675
	22½	.612	.223	.835	.447	.670
	25	.611	.222	.832	.443	.665
	30	3.609	7.218	10.827	14.436	21.654
	35	.607	.215	.822	.429	.644
	37½	.606	.213	.819	.426	.639
	40	.606	.211	.817	.422	.633
	45	3.604	7.208	10.811	14.415	21.623
	50	.602	.204	.806	.408	.612
	52½	.601	.202	.803	.404	.607
	55	.600	.200	.801	.401	.601
19	00	3.598	7.197	10.795	14.394	21.591
	05	.597	.193	.790	.387	.580
	07½	.596	.192	.787	.383	.574
	10	.595	.190	.785	.379	.569
	15	3.593	7.186	10.779	14.372	21.558
	20	.591	.182	.774	.365	.547
	22½	.590	.181	.771	.361	.542
	25	.589	.179	.768	.358	.536
	30	3.588	7.175	10.763	14.350	21.525
	35	.586	.171	.757	.343	.514
	37½	.585	.170	.754	.339	.509
	40	.584	.168	.752	.335	.503
	45	3.582	7.164	10.746	14.328	21.492
	50	.580	.160	.741	.321	.481
	52½	.579	.158	.738	.317	.475
	55	.578	.157	.735	.313	.470
20	00	3.576	7.153	10.729	14.306	21.458
	05	.575	.149	.724	.298	.447
	07½	.574	.147	.721	.294	.441
	10	.573	.145	.718	.290	.436
	15	3.571	7.141	10.712	14.283	21.424
	20	.569	.138	.706	.275	.413
	22½	.568	.136	.704	.271	.407
	25	.567	.134	.701	.268	.401
	30	3.565	7.130	10.695	14.260	21.390
	35	.563	.126	.689	.252	.378
	37½	.562	.124	.686	.248	.372
	40	.561	.122	.683	.244	.367
	45	3.559	7.118	10.678	14.237	21.355
	50	.557	.114	.672	.229	.343
	52½	.556	.112	.669	.225	.337
	55	.555	.110	.666	.221	.331
21	00	3.553	7.107	10.660	14.213	21.320

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 18°	2½	3.782	0.000
	5	7.565	.002
	7½	11.347	.004
	10	15.129	.006
	12½	18.912	.010
	15	22.694	.015
For latitude 19°	2½	3.783	0.000
	5	7.566	.002
	7½	11.348	.004
	10	15.131	.007
	12½	18.914	.011
	15	22.697	.015
For latitude 20°	2½	3.783	0.000
	5	7.566	.002
	7½	11.350	.004
	10	15.133	.007
	12½	18.916	.011
	15	22.699	.016
For latitude 21°	2½	3.784	0.000
	5	7.567	.002
	7½	11.351	.004
	10	15.135	.007
	12½	18.919	.012
	15	22.702	.017

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{48000}$—Continued

Latitude of parallel	Abscissas of developed parallel				
	Longitude interval				
	2½′	5′	7½′	10′	15′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
21 00	3.553	7.107	10.660	14.213	21.320
05	.551	.103	.654	.205	.308
07½	.550	.101	.651	.201	.302
10	.549	.099	.648	.197	.296
15	3.547	7.095	10.642	14.189	21.284
20	.545	.091	.636	.181	.272
22½	.544	.089	.633	.177	.266
25	.543	.087	.630	.173	.260
30	3.541	7.083	10.624	14.165	21.248
35	.539	.079	.618	.157	.236
37½	.538	.077	.615	.153	.230
40	.537	.075	.612	.149	.224
45	3.535	7.070	10.606	14.141	21.211
50	.533	.066	.600	.133	.199
52½	.532	.064	.596	.129	.193
55	.531	.062	.593	.125	.187
22 00	3.529	7.058	10.587	14.116	21.174
05	.527	.054	.581	.108	.162
07½	.526	.052	.578	.104	.156
10	.525	.050	.575	.100	.150
15	3.523	7.046	10.569	14.091	21.137
20	.521	.042	.562	.083	.125
22½	.520	.039	.559	.079	.118
25	.519	.037	.556	.075	.112
30	3.517	7.033	10.550	14.066	21.099
35	.514	.029	.543	.058	.087
37½	.513	.027	.540	.054	.080
40	.512	.025	.537	.049	.074
45	3.510	7.020	10.531	14.041	21.061
50	.508	.016	.524	.032	.049
52½	.507	.014	.521	.028	.042
55	.506	.012	.518	.024	.036
23 00	3.504	7.008	10.511	14.015	21.023
05	.502	.003	.505	.007	.010
07½	.501	.001	.502	.002	.003
10	.499	6.999	.498	13.998	20.997
15	3.497	6.995	10.492	13.989	20.984
20	.495	.990	.485	.981	.971
22½	.494	.988	.482	.976	.964
25	.493	.986	.479	.972	.958
30	3.491	6.982	10.472	13.963	20.945
35	.489	.977	.466	.954	.931
37½	.487	.975	.462	.950	.925
40	.486	.973	.459	.945	.918
45	3.484	6.968	10.452	13.937	20.905
50	.482	.964	.446	.928	.892
52½	.481	.962	.442	.923	.885
55	.480	.959	.439	.919	.878
24 00	3.477	6.955	10.432	13.910	20.865

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 21°	2½	3.784	0.000
	5	7.567	.002
	7½	11.351	.004
	10	15.135	.007
	12½	18.919	.012
	15	22.702	.017
For latitude 22°	2½	3.784	0.000
	5	7.568	.002
	7½	11.352	.004
	10	15.136	.008
	12½	18.921	.012
	15	22.705	.017
For latitude 23°	2½	3.785	0.000
	5	7.569	.002
	7½	11.354	.004
	10	15.138	.008
	12½	18.923	.012
	15	22.708	.018
For latitude 24°	2½	3.785	0.001
	5	7.570	.002
	7½	11.355	.005
	10	15.140	.008
	12½	18.926	.013
	15	22.711	.019

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{48000}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		2½′	5′	7½′	10′	15′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
24	00	3.477	6.955	10.432	13.910	20.865
	05	.475	.950	.426	.900	.851
	07½	.474	.948	.422	.896	.845
	10	.473	.946	.419	.892	.838
	15	3.471	6.941	10.412	13.883	20.824
	20	.468	.937	.405	.874	.811
	22½	.467	.935	.402	.869	.804
	25	.466	.932	.398	.865	.797
	30	3.464	6.928	10.392	13.856	20.783
	35	.462	.923	.385	.846	.770
	37½	.460	.921	.381	.842	.763
	40	.459	.919	.378	.837	.756
	45	3.457	6.914	10.371	13.828	20.742
	50	.455	.909	.364	.819	.728
	52½	.454	.907	.361	.814	.721
	55	.452	.905	.357	.810	.714
25	00	3.450	6.900	10.350	13.800	20.700
	05	.448	.895	.343	.791	.686
	07½	.447	.893	.340	.786	.679
	10	.445	.891	.336	.782	.672
	15	3.443	6.886	10.329	13.772	20.658
	20	.441	.881	.322	.763	.644
	22½	.440	.879	.318	.758	.637
	25	.438	.877	.315	.753	.630
	30	3.436	6.872	10.308	13.744	20.616
	35	.434	.867	.301	.734	.602
	37½	.432	.865	.297	.730	.594
	40	.431	.862	.294	.725	.587
	45	3.429	6.858	10.286	13.715	20.573
	50	.426	.853	.279	.706	.559
	52½	.425	.850	.276	.701	.551
	55	.424	.848	.272	.696	.544
26	00	3.422	6.843	10.265	13.686	20.530
	05	.419	.838	.258	.677	.515
	07½	.418	.836	.254	.672	.508
	10	.417	.834	.250	.667	.501
	15	3.414	6.829	10.243	13.657	20.486
	20	.412	.824	.236	.648	.471
	22½	.411	.821	.232	.643	.464
	25	.409	.819	.228	.638	.457
	30	3.407	6.814	10.221	13.628	20.442
	35	.405	.809	.214	.618	.427
	37½	.403	.807	.210	.613	.420
	40	.402	.804	.206	.608	.412
	45	3.400	6.799	10.199	13.598	20.398
	50	.397	.794	.191	.588	.383
	52½	.396	.792	.188	.584	.375
	55	.395	.789	.184	.579	.368
27	00	3.392	6.784	10.176	13.569	20.353

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 24°	2½	3.785	0.001
	5	7.570	.002
	7½	11.355	.005
	10	15.140	.008
	12½	18.926	.013
	15	22.711	.019
For latitude 25°	2½	3.786	0.001
	5	7.571	.002
	7½	11.357	.005
	10	15.142	.008
	12½	18.928	.013
	15	22.714	.019
For latitude 26°	2½	3.786	0.001
	5	7.572	.002
	7½	11.358	.005
	10	15.144	.009
	12½	18.931	.014
	15	22.717	.020
For latitude 27°	2½	3.787	0.001
	5	7.573	.002
	7½	11.360	.005
	10	15.147	.009
	12½	18.934	.014
	15	22.720	.020

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{48000}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		2½′	5′	7½′	10′	15′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
27	00	3.392	6.784	10.176	13.569	20.353
	05	.390	.779	.169	.559	.338
	07½	.388	.777	.165	.553	.330
	10	.387	.774	.161	.548	.323
	15	3.385	6.769	10.154	13.538	20.308
	20	.382	.764	.146	.528	.292
	22½	.381	.762	.142	.523	.285
	25	.380	.759	.139	.518	.277
	30	3.377	6.754	10.131	13.508	20.262
	35	.374	.749	.123	.498	.247
	37½	.373	.746	.120	.493	.239
	40	.372	.744	.116	.488	.231
	45	3.369	6.739	10.108	13.477	20.216
	50	.367	.734	.100	.467	.201
	52½	.365	.731	.096	.462	.193
	55	.364	.728	.093	.457	.185
28	00	3.362	6.723	10.085	13.446	20.170
	05	.359	.718	.077	.436	.154
	07½	.358	.715	.073	.431	.146
	10	.356	.713	.069	.426	.139
	15	3.354	6.708	10.061	13.415	20.123
	20	.351	.702	.054	.405	.107
	22½	.350	.700	.050	.400	.099
	25	.349	.697	.046	.394	.092
	30	3.346	6.692	10.038	13.384	20.076
	35	.343	.687	.030	.373	.060
	37½	.342	.684	.026	.368	.052
	40	.341	.681	.022	.363	.044
	45	3.338	6.676	10.014	13.352	20.028
	50	.335	.671	.006	.342	.012
	52½	.334	.668	.002	.336	.004
	55	.333	.666	9.998	.331	19.996
29	00	3.330	6.660	9.990	13.320	19.980
	05	.327	.655	.982	.310	.964
	07½	.326	.652	.978	.304	.956
	10	.325	.649	.974	.299	.948
	15	3.322	6.644	9.966	13.288	19.932
	20	.319	.639	.958	.277	.916
	22½	.318	.636	.954	.272	.908
	25	.317	.633	.950	.267	.900
	30	3.314	6.628	9.942	13.256	19.884
	35	.311	.622	.934	.245	.867
	37½	.310	.620	.929	.239	.859
	40	.308	.617	.925	.234	.851
	45	3.306	6.611	9.917	13.223	19.835
	50	.303	.606	.909	.212	.818
	52½	.302	.603	.905	.207	.810
	55	.300	.601	.901	.201	.802
30	00	3.298	6.595	9.893	13.190	19.785

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 27°	2½	3.787	0.001
	5	7.573	.002
	7½	11.360	.005
	10	15.147	.009
	12½	18.934	.014
	15	22.720	.020
For latitude 28°	2½	3.787	0.001
	5	7.574	.002
	7½	11.362	.005
	10	15.149	.009
	12½	18.936	.014
	15	22.723	.021
For latitude 29°	2½	3.788	0.001
	5	7.575	.002
	7½	11.363	.005
	10	15.151	.009
	12½	18.939	.015
	15	22.727	.021
For latitude 30°	2½	3.788	0.001
	5	7.577	.002
	7½	11.365	.005
	10	15.153	.010
	12½	18.942	.015
	15	22.730	.022

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{45000}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		2½′	5′	7½′	10′	15′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
30	00	3.298	6.595	9.893	13.190	19.785
	05	.295	.589	.884	.179	.769
	07½	.293	.587	.880	.174	.760
	10	.292	.584	.876	.168	.752
	15	3.289	6.578	9.868	13.157	19.735
	20	.286	.573	.859	.146	.719
	22½	.285	.570	.855	.140	.710
	25	.284	.567	.851	.135	.702
	30	3.281	6.562	9.843	13.123	19.685
	35	.278	.556	.834	.112	.668
	37½	.277	.553	.830	.107	.660
	40	.275	.551	.826	.101	.652
	45	3.272	6.545	9.817	13.090	19.635
	50	.270	.539	.809	.078	.618
	52½	.268	.536	.805	.073	.609
	55	.267	.534	.800	.067	.601
31	00	3.264	6.528	9.792	13.056	19.584
	05	.261	.522	.783	.044	.567
	07½	.260	.519	.779	.039	.558
	10	.258	.517	.775	.033	.550
	15	3.255	6.511	9.766	13.022	19.532
	20	.253	.505	.758	.010	.515
	22½	.251	.502	.753	.004	.507
	25	.250	.499	.749	12.999	.498
	30	3.247	6.494	9.740	12.987	19.481
	35	.244	.488	.732	.976	.464
	37½	.242	.485	.727	.970	.455
	40	.241	.482	.723	.964	.446
	45	3.238	6.476	9.714	12.953	19.429
	50	.235	.470	.706	.941	.411
	52½	.234	.468	.701	.935	.403
	55	.232	.465	.697	.929	.394
32	00	3.229	6.459	9.688	12.918	19.376
	05	.226	.453	.679	.906	.359
	07½	.225	.450	.675	.900	.350
	10	.224	.447	.671	.894	.341
	15	3.221	6.441	9.662	12.882	19.324
	20	.218	.435	.653	.871	.307
	22½	.216	.432	.649	.865	.297
	25	.215	.429	.644	.859	.288
	30	3.212	6.424	9.635	12.847	19.271
	35	.209	.418	.626	.835	.253
	37½	.207	.415	.622	.829	.244
	40	.206	.412	.617	.823	.235
	45	3.203	6.406	9.608	12.811	19.217
	50	.200	.400	.600	.799	.199
	52½	.198	.397	.595	.793	.190
	55	.197	.394	.591	.787	.181
33	00	3.194	6.388	9.582	12.775	19.163

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 30°	2½	3.788	0.001
	5	7.577	.002
	7½	11.365	.005
	10	15.153	.010
	12½	18.942	.015
	15	22.730	.022
For latitude 31°	2½	3.789	0.001
	5	7.578	.002
	7½	11.367	.005
	10	15.156	.010
	12½	18.945	.015
	15	22.734	.022
For latitude 32°	2½	3.789	0.001
	5	7.579	.002
	7½	11.369	.006
	10	15.158	.010
	12½	18.948	.016
	15	22.737	.022
For latitude 33°	2½	3.790	0.001
	5	7.580	.003
	7½	11.370	.006
	10	15.161	.010
	12½	18.951	.016
	15	22.741	.023

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{48000}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		2½′	5′	7½′	10′	15′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
33	00	3.194	6.388	9.582	12.775	19.163
	05	.191	.382	.573	.763	.145
	07½	.189	.379	.568	.757	.136
	10	.188	.376	.564	.751	.127
	15	3.185	6.370	9.554	12.739	19.109
	20	.182	.364	.545	.727	.091
	22½	.180	.361	.541	.721	.082
	25	.179	.358	.536	.715	.073
	30	3.176	6.351	9.527	12.703	19.054
	35	.173	.345	.518	.691	.036
	37½	.171	.342	.513	.685	.027
	40	.170	.339	.509	.679	.018
	45	3.167	6.333	9.500	12.666	18.999
	50	.164	.327	.491	.654	.981
	52½	.162	.324	.486	.648	.972
	55	.160	.321	.481	.642	.963
34	00	3.157	6.315	9.472	12.629	18.944
	05	.154	.309	.463	.617	.926
	07½	.153	.305	.458	.611	.916
	10	.151	.302	.453	.605	.907
	15	3.148	6.296	9.444	12.592	18.888
	20	.145	.290	.435	.580	.870
	22½	.143	.287	.430	.574	.860
	25	.142	.284	.426	.567	.851
	30	3.139	6.277	9.416	12.555	18.832
	35	.136	.271	.407	.542	.814
	37½	.134	.268	.402	.536	.804
	40	.132	.265	.397	.530	.795
	45	3.129	6.259	9.388	12.517	18.776
	50	.126	.252	.379	.505	.757
	52½	.125	.249	.374	.498	.748
	55	.123	.246	.369	.492	.738
35	00	3.120	6.240	9.360	12.480	18.719
	05	.117	.233	.350	.467	.700
	07½	.115	.230	.345	.460	.691
	10	.114	.227	.341	.454	.681
	15	3.110	6.221	9.331	12.441	18.662
	20	.107	.214	.321	.429	.643
	22½	.106	.211	.317	.422	.633
	25	.104	.208	.312	.416	.624
	30	3.101	6.202	9.302	12.403	18.605
	35	.098	.195	.293	.390	.585
	37½	.096	.192	.288	.384	.576
	40	.094	.189	.283	.377	.566
	45	3.091	6.182	9.273	12.365	18.547
	50	.088	.176	.264	.352	.528
	52½	.086	.173	.259	.345	.518
	55	.085	.169	.254	.339	.508
36	00	3.081	6.163	9.244	12.326	18.489

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 33°	2½	3.790	0.001
	5	7.580	.003
	7½	11.370	.006
	10	15.161	.010
	12½	18.951	.016
	15	22.741	.023
For latitude 34°	2½	3.791	0.001
	5	7.581	.003
	7½	11.372	.006
	10	15.163	.010
	12½	18.954	.016
	15	22.745	.023
For latitude 35°	2½	3.791	0.001
	5	7.583	.003
	7½	11.374	.006
	10	15.166	.010
	12½	18.957	.016
	15	22.748	.023
For latitude 36°	2½	3.792	0.001
	5	7.584	.003
	7½	11.376	.006
	10	15.168	.010
	12½	18.961	.016
	15	22.752	.024

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{48000}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		2½′	5′	7½′	10′	15′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
36	00	3.081	6.163	9.244	12.326	18.489
	05	.078	.156	.235	.313	.469
	07½	.077	.153	.230	.306	.459
	10	.075	.150	.225	.300	.450
	15	3.072	6.143	9.215	12.287	18.430
	20	.068	.137	.205	.274	.411
	22½	.067	.134	.200	.267	.401
	25	.065	.130	.195	.261	.391
	30	3.062	6.124	9.186	12.248	.371
	35	.059	.117	.176	.234	.352
	37½	.057	.114	.171	.228	.342
	40	055	.111	.166	.221	.332
	45	3.052	6.104	9.156	12.208	18.312
	50	.049	.097	.146	.195	.292
	52½	.047	.094	.141	.188	.282
	55	.045	.091	.136	.182	.272
37	00	3.042	6.084	9.126	12.168	18.252
	05	.039	.077	.116	.155	.233
	07½	.037	.074	.111	.148	.223
	10	.035	.071	.106	.142	.213
	15	3.032	6.064	9.096	12.128	18.193
	20	.029	.057	.086	.115	.172
	22½	.027	.054	.081	.108	.162
	25	.025	.051	.076	.102	.152
	30	3.022	6.044	9.066	12.088	18.132
	35	.019	.037	.056	.075	.112
	37½	.017	.034	.051	.068	.102
	40	.015	.031	.046	.061	.092
	45	3.012	6.024	9.036	12.048	18.072
	50	.009	.017	.026	.034	.051
	52½	.007	.014	.021	.027	.041
	55	.005	.010	.015	.021	.031
38	00	3.002	6.004	9.005	12.007	18.011
	05	2.998	5.997	8.995	11.994	17.990
	07½	.997	.993	.990	.987	.980
	10	.995	.990	.985	.980	.970
	15	2.992	5.983	8.975	11.966	17.949
	20	.988	.976	.964	.953	.929
	22½	.986	.973	.959	.946	.919
	25	.985	.969	.954	.939	.908
	30	2.982	5.963	8.944	11.925	17.888
	35	.978	.956	.934	.911	.867
	37½	.976	.952	.928	.905	.857
	40	.974	.949	.923	.898	.846
	45	2.971	5.942	8.913	11.884	17.826
	50	.968	.935	.903	.870	.805
	52½	.966	.932	.897	.863	.795
	55	.964	.928	.892	.856	.784
39	00	2.961	5.921	8.882	11.842	17.763

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 36°	2½	3.792	0.001
	5	7.584	.003
	7½	11.376	.006
	10	15.168	.010
	12½	18.961	.016
	15	22.752	.024
For latitude 37°	2½	3.793	0.001
	5	7.585	.003
	7½	11.378	.006
	10	15.171	.011
	12½	18.964	.017
	15	22.756	.024
For latitude 38°	2½	3.793	0.001
	5	7.587	.003
	7½	11.380	.006
	10	15.173	.011
	12½	18.967	.017
	15	22.760	.024
For latitude 39°	2½	3.794	0.001
	5	7.588	.003
	7½	11.382	.006
	10	15.176	.011
	12½	18.970	.017
	15	22.764	.024

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{45000}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		2½′	5′	7½′	10′	15′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
39	00	2.961	5.921	8.882	11.842	17.763
	05	.957	.914	.871	.828	.743
	07½	.955	.911	.866	.821	.732
	10	.954	.907	.861	.814	.722
	15	2.950	5.900	8.850	11.800	17.701
	20	.947	.893	.840	.786	.680
	22½	.945	.890	.835	.779	.669
	25	.943	.886	.829	.772	.659
	30	2.940	5.879	8.819	11.758	17.638
	35	.936	.872	.808	.744	.617
	37½	.934	.869	.803	.737	.606
	40	.933	.865	.798	.730	.595
	45	2.929	5.858	8.787	11.716	17.574
	50	.926	.851	.777	.702	.553
	52½	.924	.848	.771	.695	.543
	55	.922	.844	.766	.688	.532
40	00	2.918	5.837	8.755	11.674	17.511
	05	.915	.830	.745	.660	.489
	07½	.913	.826	.739	.652	.479
	10	.911	.823	.734	.645	.468
	15	2.908	5.816	8.723	11.631	17.447
	20	.904	.808	.713	.617	.425
	22½	.902	.805	.707	.610	.414
	25	.901	.801	.702	.603	.404
	30	2.897	5.794	8.691	11.588	17.382
	35	.893	.787	.680	.574	.361
	37½	.892	.783	.675	.567	.350
	40	.890	.780	.670	.559	.339
	45	2.886	5.773	8.659	11.545	17.318
	50	.883	.765	.648	.531	.296
	52½	.881	.762	.643	.523	.285
	55	.879	.758	.637	.516	.274
41	00	2.875	5.751	8.626	11.502	17.253
	05	.872	.744	.615	.487	.231
	07½	.870	.740	.610	.480	.220
	10	.868	.736	.605	.473	.209
	15	2.864	5.729	8.594	11.458	17.187
	20	.861	.722	.583	.444	.165
	22½	.859	.718	.577	.436	.154
	25	.857	.714	.572	.429	.143
	30	2.854	5.707	8.561	11.414	17.122
	35	.850	.700	.550	.400	.100
	37½	.848	.696	.544	.392	.089
	40	.846	.692	.539	.385	.078
	45	2.843	5.685	8.528	11.370	17.056
	50	.839	.678	.517	.356	.033
	52½	.837	.674	.511	.348	.022
	55	.835	.670	.506	.341	.011
42	00	2.832	5.663	8.495	11.326	16.989

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 39°	2½	3.794	0.001
	5	7.588	.003
	7½	11.382	.006
	10	15.176	.011
	12½	18.970	.017
	15	22.764	.024
For latitude 40°	2½	3.795	0.001
	5	7.589	.003
	7½	11.384	.006
	10	15.179	.011
	12½	18.974	.017
	15	22.768	.025
For latitude 41°	2½	3.795	0.001
	5	7.591	.003
	7½	11.386	.006
	10	15.181	.011
	12½	18.977	.017
	15	22.772	.025
For latitude 42°	2½	3.796	0.001
	5	7.592	.003
	7½	11.388	.006
	10	15.184	.011
	12½	18.980	.017
	15	22.776	.025

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{48000}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		2½′	5′	7½′	10′	15′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
42	00	2.832	5.663	8.495	11.326	16.989
	05	.828	.656	.483	.311	.967
	07½	.826	.652	.478	.304	.956
	10	.824	.648	.472	.297	.945
	15	2.820	5.641	8.461	11.282	16.923
	20	.817	.633	.450	.267	.900
	22½	.815	.630	.445	.259	.889
	25	.813	.626	.439	.252	.878
	30	2.809	5.619	8.428	11.237	16.856
	35	.806	.611	.417	.222	.833
	37½	.804	.607	.411	.215	.822
	40	.802	.604	.405	.207	.811
	45	2.798	5.596	8.394	11.192	16.788
	50	.794	.589	.383	.177	.766
	52½	.792	.585	.377	.170	.754
	55	.791	.581	.372	.162	.743
43	00	2.787	5.574	8.360	11.147	16.721
	05	.783	.566	.349	.132	.698
	07½	.781	.562	.343	.124	.687
	10	.779	.558	.338	.117	.675
	15	2.775	5.551	8.326	11.102	16.653
	20	.772	.543	.315	.087	.630
	22½	.770	.540	.309	.079	.619
	25	.768	.536	.304	.071	.607
	30	2.764	5.528	8.292	11.056	16.584
	35	.760	.520	.281	.041	.562
	37½	.758	.517	.275	.033	.550
	40	.756	.513	.269	.026	.539
	45	2.753	5.505	8.258	11.011	16.516
	50	.749	.498	.246	10.995	.493
	52½	.747	.494	.241	.988	.481
	55	.745	.490	.235	.980	.470
44	00	2.741	5.482	8.223	10.965	16.447
	05	.737	.475	.212	.949	.424
	07½	.735	.471	.206	.942	.412
	10	.733	.467	.200	.934	.401
	15	2.730	5.459	8.189	10.918	16.378
	20	.726	.452	.177	.903	.355
	22½	.724	.448	.171	.895	.343
	25	.722	.444	.166	.888	.331
	30	2.718	5.436	8.154	10.872	16.308
	35	.714	.428	.142	.857	.285
	37½	.712	.424	.137	.849	.273
	40	.710	.421	.131	.841	.262
	45	2.706	5.413	8.119	10.826	16.238
	50	.703	.405	.108	.810	.215
	52½	.701	.401	.102	.802	.203
	55	.699	.397	.096	.794	.192
45	00	2.695	5.389	8.084	10.779	16.168

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 42°	2½	3.796	0.001
	5	7.592	.003
	7½	11.388	.006
	10	15.184	.011
	12½	18.980	.017
	15	22.776	.025
For latitude 43°	2½	3.797	0.001
	5	7.593	.003
	7½	11.390	.006
	10	15.187	.011
	12½	18.984	.017
	15	22.780	.025
For latitude 44°	2½	3.797	0.001
	5	7.595	.003
	7½	11.392	.006
	10	15.189	.011
	12½	18.987	.017
	15	22.784	.025
For latitude 45°	2½	3.798	0.001
	5	7.596	.003
	7½	11.394	.006
	10	15.192	.011
	12½	18.990	.017
	15	22.788	.025

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{48000}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		2½′	5′	7½′	10′	15′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
45	00	2.695	5.389	8.084	10.779	16.168
	05	.691	.382	.072	.763	.145
	07½	.689	.378	.066	.755	.133
	10	.687	.374	.061	.747	.121
	15	2.683	5.366	8.049	10.732	16.098
	20	.679	.358	.037	.716	.074
	22½	.677	.354	.031	.708	.062
	25	.675	.350	.025	.700	.051
	30	2.671	5.342	8.014	10.685	16.027
	35	.667	.334	.002	.669	.003
	37½	.665	.330	7.996	.661	15.991
	40	.663	.327	.990	.653	.980
	45	2.659	5.319	7.978	10.637	15.956
	50	.655	.311	.966	.621	.932
	52½	.653	.307	.960	.613	.920
	55	.651	.303	.954	.606	.908
46	00	2.647	5.295	7.942	10.590	15.884
	05	.643	.287	.930	.574	.861
	07½	.641	.283	.924	.566	.849
	10	.639	.279	.918	.558	.837
	15	2.635	5.271	7.906	10.542	15.813
	20	.631	.263	.894	.526	.789
	22½	.629	.259	.888	.518	.777
	25	.627	.255	.882	.510	.765
	30	2.623	5.247	7.870	10.494	15.741
	35	.619	.239	.858	.478	.717
	37½	.617	.235	.852	.470	.705
	40	.615	.231	.846	.462	.693
	45	2.611	5.223	7.834	10.446	15.669
	50	.607	.215	.822	.430	.644
	52½	.605	.211	.816	.422	.632
	55	.603	.207	.810	.413	.620
47	00	2.599	5.199	7.798	10.397	15.596
	05	.595	.191	.786	.381	.572
	07½	.593	.187	.780	.373	.560
	10	.591	.182	.774	.365	.547
	15	2.587	5.174	7.762	10.349	15.523
	20	.583	.166	.749	.332	.499
	22½	.581	.162	.743	.324	.486
	25	.579	.158	.737	.316	.474
	30	2.575	5.150	7.725	10.300	15.450
	35	.571	.142	.713	.284	.425
	37½	.569	.138	.707	.275	.413
	40	.567	.134	.700	.267	.401
	45	2.563	5.125	7.688	10.251	15.376
	50	.559	.117	.676	.235	.352
	52½	.557	.113	.670	.226	.339
	55	.555	.109	.664	.218	.327
48	00	2.550	5.101	7.651	10.202	15.303

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 45°	2½	3.798	0.001
	5	7.596	.003
	7½	11.394	.006
	10	15.192	.011
	12½	18.990	.017
	15	22.788	.025
For latitude 46°	2½	3.799	0.001
	5	7.597	.003
	7½	11.396	.006
	10	15.195	.011
	12½	18.994	.017
	15	22.792	.025
For latitude 47°	2½	3.799	0.001
	5	7.599	.003
	7½	11.398	.006
	10	15.197	.011
	12½	18.997	.017
	15	22.796	.025
For latitude 48°	2½	3.800	0.001
	5	7.600	.003
	7½	11.400	.006
	10	15.200	.011
	12½	19.000	.017
	15	22.800	.025

TABLE 2.—*Coordinates for the projection of maps, scale* $\frac{1}{48000}$—Continued

Latitude of parallel		Abscissas of developed parallel				
		Longitude interval				
		2½′	5′	7½′	10′	15′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
48	00	2.550	5.101	7.651	10.202	15.303
	05	.546	.093	.639	.185	.278
	07½	.544	.088	.633	.177	.266
	10	.542	.084	.627	.169	.253
	15	2.538	5.076	7.614	10.152	15.228
	20	.534	.068	.602	.136	.204
	22½	.532	.064	.596	.128	.191
	25	.530	.060	.589	.119	.179
	30	2.526	5.051	7.577	10.103	15.154
	35	.522	.043	.565	.086	.129
	37½	.519	.039	.558	.078	.117
	40	.517	.035	.552	.070	.104
	45	2.513	5.026	7.540	10.053	15.079
	50	.509	.018	.527	.036	.055
	52½	.507	.014	.521	.028	.042
	55	.505	.010	.515	.020	.030
49	00	2.501	5.001	7.502	10.003	15.005
	05	.497	4.993	.490	9.986	14.979
	07½	.494	.989	.483	.978	.967
	10	.492	.985	.477	.970	.954
	15	2.488	4.976	7.465	9.953	14.929
	20	.484	.968	.452	.936	.904
	22½	.482	.964	.446	.928	.892
	25	.480	.960	.439	.919	.879
	30	2.476	4.951	7.427	9.902	14.854
	35	.471	.943	.414	.886	.829
	37½	.469	.939	.408	.877	.816
	40	.467	.934	.402	.869	.803
	45	2.463	4.926	7.389	9.852	14.778
	50	.459	.918	.376	.835	.753
	52½	.457	.913	.370	.827	.740
	55	.455	.909	.364	.818	.727
50	00	2.450	4.901	7.351	9.801	14.702
	05	.446	.892	.338	.784	.676
	07½	.444	.888	.332	.776	.664
	10	.442	.884	.326	.767	.651
	15	2.438	4.875	7.313	9.750	14.625
	20	.433	.867	.300	.733	.600
	22½	.431	.862	.294	.725	.587
	25	.429	.858	.287	.716	.574
	30	2.425	4.850	7.274	9.699	14.549
	35	.421	.841	.262	.682	.523
	37½	.418	.837	.255	.674	.510
	40	.416	.833	.249	.665	.498
	45	2.412	4.824	7.236	9.648	14.472
	50	.408	.815	.223	.631	.446
	52½	.406	.811	.217	.622	.433
	55	.403	.807	.210	.614	.420
51	00	2.399	4.798	7.197	9.596	14.395

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 48°	2½	3.800	0.001
	5	7.600	.003
	7½	11.400	.006
	10	15.200	.011
	12½	19.000	.017
	15	22.800	.025
For latitude 49°	2½	3.801	0.001
	5	7.601	.003
	7½	11.402	.006
	10	15.203	.011
	12½	19.004	.017
	15	22.804	.025
For latitude 50°	2½	3.801	0.001
	5	7.603	.003
	7½	11.404	.006
	10	15.205	.011
	12½	19.007	.017
	15	22.808	.025
For latitude 51°	2½	3.802	0.001
	5	7.604	.003
	7½	11.406	.006
	10	15.208	.011
	12½	19.011	.017
	15	22.812	.024

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
0	00	2.306	2.882	5.764	8.646	11.529	17.293			
	02½	.306	.882	.764	.646	.529	.293			
	03¾	.306	.882	.764	.646	.529	.293			
	05	.306	.882	.764	.646	.529	.293			
	07½	.306	.882	.764	.646	.529	.293			
	10	2.306	2.882	5.764	8.646	11.529	17.293			
	11¼	.306	.882	.764	.646	.528	.293			
	12½	.306	.882	.764	.646	.528	.293			
	15	.306	.882	.764	.646	.528	.293			
	17½	.306	.882	.764	.646	.528	.293			
	18¾	.306	.882	.764	.646	.528	.293			
	20	2.306	2.882	5.764	8.646	11.528	17.293			
	22½	.306	.882	.764	.646	.528	.293			
	25	.306	.882	.764	.646	.528	.292			
	26¼	.306	.882	.764	.646	.528	.292			
	27½	.306	.882	.764	.646	.528	.292			
	30	2.306	2.882	5.764	8.646	11.528	17.292			
	32½	.306	.882	.764	.646	.528	.292			
	33¾	.306	.882	.764	.646	.528	.292			
	35	.306	.882	.764	.646	.528	.292			
	37½	.306	.882	.764	.646	.528	.292			
	40	2.306	2.882	5.764	8.646	11.528	17.292			
	41¼	.306	.882	.764	.646	.528	.292			
	42½	.306	.882	.764	.646	.528	.291			
	45	.306	.882	.764	.646	.528	.291			
	47½	.305	.882	.764	.646	.527	.291			
	48¾	.305	.882	.764	.646	.527	.291			
	50	2.305	2.882	5.764	8.645	11.527	17.291			
	52½	.305	.882	.764	.645	.527	.291			
	55	.305	.882	.764	.645	.527	.291			
	56¼	.305	.882	.763	.645	.527	.290			
	57½	.305	.882	.763	.645	.527	.290			
1	00	2.305	2.882	5.763	8.645	11.527	17.290			
	02½	.305	.882	.763	.645	.527	.290			
	03¾	.305	.882	.763	.645	.527	.290			
	05	.305	.882	.763	.645	.527	.290			
	07½	.305	.882	.763	.645	.526	.290			
	10	2.305	2.882	5.763	8.645	11.526	17.289			
	11¼	.305	.882	.763	.645	.526	.289			
	12½	.305	.881	.763	.644	.526	.289			
	15	.305	.881	.763	.644	.526	.289			
	17½	.305	.881	.763	.644	.526	.288			
	18¾	.305	.881	.763	.644	.526	.288			
	20	2.305	2.881	5.763	8.644	11.525	17.288			
	22½	.305	.881	.763	.644	.525	.288			
	25	.305	.881	.763	.644	.525	.288			
	26¼	.305	.881	.762	.644	.525	.287			
	27½	.305	.881	.762	.644	.525	.287			
	30	2.305	2.881	5.762	8.643	11.525	17.287			
	32½	.305	.881	.762	.643	.524	.287			
	33¾	.305	.881	.762	.643	.524	.286			
	35	.305	.881	.762	.643	.524	.286			
	37½	.305	.881	.762	.643	.524	.286			
	40	2.305	2.881	5.762	8.643	11.524	17.286			
	41¼	.305	.881	.762	.643	.524	.285			
	42½	.305	.881	.762	.643	.523	.285			
	45	.305	.881	.762	.642	.523	.285			
	47½	.305	.881	.761	.642	.523	.284			
	48¾	.305	.881	.761	.642	.523	.284			
	50	2.305	2.881	5.761	8.642	11.523	17.284			
	52½	.304	.881	.761	.642	.522	.284			
	55	.304	.881	.761	.642	.522	.283			
	56¼	.304	.881	.761	.642	.522	.283			
	57½	.304	.880	.761	.641	.522	.283			
2	00	2.304	2.880	5.761	8.641	11.522	17.282			

For latitude 0°	1¼	2.863	0.000
	2½	5.725	.000
	3¾	8.588	.000
	5	11.450	.000
	6¼	14.313	.000
	7½	17.176	.000
	10	22.901	.000
	12½	28.626	.000
	15	34.352	.000
For latitude 1°	1¼	2.863	0.000
	2½	5.725	.000
	3¾	8.588	.000
	5	11.451	.000
	6¼	14.313	.000
	7½	17.176	.000
	10	22.901	.001
	12½	28.626	.001
	15	34.352	.001
For latitude 2°	1¼	2.863	0.000
	2½	5.725	.000
	3¾	8.588	.000
	5	11.451	.000
	6¼	14.313	.000
	7½	17.176	.001
	10	22.901	.001
	12½	28.627	.002
	15	34.352	.003

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
2	00	2.304	2.880	5.761	8.641	11.522	17.282			
	02½	.304	.880	.761	.641	.521	.282			
	03¾	.304	.880	.761	.641	.521	.282			
	05	.304	.880	.760	.641	.521	.281			
	07½	.304	.880	.760	.640	.521	.281	For latitude 2° 1¼	2.863	0.000
								2½	5.725	.000
								3¾	8.588	.000
								5	11.451	.000
								6¼	14.313	.000
								7½	17.176	.001
	10	2.304	2.880	5.760	8.640	11.520	17.281	10	22.901	.001
	11¼	.304	.880	.760	.640	.520	.280			
	12½	.304	.880	.760	.640	.520	.280	12½	28.627	.002
	15	.304	.880	.760	.640	.520	.280	15	34.352	.003
	17½	.304	.880	.760	.640	.519	.279			
	18¾	.304	.880	.760	.639	.519	.279			
								For latitude 3° 1¼	2.863	0.000
								2½	5.725	.000
								3¾	8.588	.000
								5	11.451	.000
								6¼	14.314	.001
								7½	17.176	.001
	20	2.304	2.880	5.760	8.639	11.519	17.279	10	22.902	.002
	22½	.304	.880	.759	.639	.519	.278			
	25	.304	.880	.759	.639	.518	.278	12½	28.627	.003
	26¼	.304	.880	.759	.639	.518	.277	15	34.353	.004
	27½	.304	.880	.759	.639	.518	.277			
	30	2.304	2.879	5.759	8.638	11.518	17.276			
	32½	.303	.879	.759	.638	.517	.276			
	33¾	.303	.879	.759	.638	.517	.276			
	35	.303	.879	.758	.638	.517	.275			
	37½	.303	.879	.758	.637	.516	.275			
								For latitude 4° 1¼	2.863	0.000
								2½	5.726	.000
								3¾	8.588	.000
								5	11.451	.001
								6¼	14.314	.001
								7½	17.177	.001
	40	2.303	2.879	5.758	8.637	11.516	17.274	10	22.902	.002
	41¼	.303	.879	.758	.637	.516	.274			
	42½	.303	.879	.758	.637	.516	.274	12½	28.628	.004
	45	.303	.879	.758	.637	.515	.273	15	34.353	.005
	47½	.303	.879	.757	.636	.515	.272			
	48¾	.303	.879	.757	.636	.515	.272			
	50	2.303	2.879	5.757	8.636	11.515	17.272			
	52½	.303	.879	.757	.636	.514	.271			
	55	.303	.878	.757	.635	.514	.271			
	56¼	.303	.878	.757	.635	.513	.270			
	57½	.303	.878	.757	.635	.513	.270			
3	00	2.303	2.878	5.756	8.635	11.513	17.269			
	02½	.302	.878	.756	.634	.512	.269			
	03¾	.302	.878	.756	.634	.512	.268			
	05	.302	.878	.756	.634	.512	.268			
	07½	.302	.878	.756	.634	.512	.267			
	10	2.302	2.878	5.756	8.633	11.511	17.267			
	11¼	.302	.878	.755	.633	.511	.266			
	12½	.302	.878	.755	.633	.511	.266			
	15	.302	.878	.755	.633	.510	.265			
	17½	.302	.877	.755	.632	.510	.264			
	18¾	.302	.877	.755	.632	.509	.264			
	20	2.302	2.877	5.755	8.632	11.509	17.264			
	22½	.302	.877	.754	.632	.509	.263			
	25	.302	.877	.754	.631	.508	.262			
	26¼	.302	.877	.754	.631	.508	.262			
	27½	.302	.877	.754	.631	.508	.262			
	30	2.301	2.877	5.754	8.630	11.507	17.261			
	32½	.301	.877	.753	.630	.507	.260			
	33¾	.301	.877	.753	.630	.506	.260			
	35	.301	.877	.753	.630	.506	.259			
	37½	.301	.876	.753	.629	.506	.258			
	40	2.301	2.876	5.753	8.629	11.505	17.258			
	41¼	.301	.876	.752	.629	.505	.257			
	42½	.301	.876	.752	.628	.505	.257			
	45	.301	.876	.752	.628	.504	.256			
	47½	.301	.876	.752	.628	.503	.255			
	48¾	.301	.876	.752	.627	.503	.255			
	50	2.301	2.876	5.751	8.627	11.503	17.254			
	52½	.300	.876	.751	.627	.502	.254			
	55	.300	.875	.751	.626	.502	.253			
	56¼	.300	.875	.751	.626	.502	.252			
	57½	.300	.875	.751	.626	.501	.252			
4	00	2.300	2.875	5.750	8.625	11.501	17.251			

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel	Abscissas of developed parallel: Longitude interval 1′	1¼′	2½′	3¾′	5′	7½′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
4 00	2.300	2.875	5.750	8.625	11.501	17.251
02½	.300	.875	.750	.625	.500	.250
03¾	.300	.875	.750	.625	.500	.250
05	.300	.875	.750	.625	.500	.249
07½	.300	.875	.749	.624	.499	.248
10	2.300	2.875	5.749	8.624	11.498	17.247
11¼	.300	.875	.749	.624	.498	.247
12½	.300	.874	.749	.623	.498	.247
15	.299	.874	.749	.623	.497	.246
17½	.299	.874	.748	.622	.496	.245
18¾	.299	.874	.748	.622	.496	.244
20	2.299	2.874	5.748	8.622	11.496	17.244
22½	.299	.874	.748	.621	.495	.243
25	.299	.874	.747	.621	.495	.242
26¼	.299	.874	.747	.621	.494	.241
27½	.299	.873	.747	.620	.494	.241
30	2.299	2.873	5.747	8.620	11.493	17.240
32½	.299	.873	.746	.619	.493	.239
33¾	.299	.873	.746	.619	.492	.238
35	.298	.873	.746	.619	.492	.238
37½	.298	.873	.746	.618	.491	.237
40	2.298	2.873	5.745	8.618	11.491	17.236
41¼	.298	.873	.745	.618	.490	.235
42½	.298	.872	.745	.617	.490	.235
45	.298	.872	.745	.617	.489	.234
47½	.298	.872	.744	.616	.489	.233
48¾	.298	.872	.744	.616	.488	.232
50	2.298	2.872	5.744	8.616	11.488	17.232
52½	.297	.872	.744	.615	.487	.231
55	.297	.872	.743	.615	.486	.230
56¼	.297	.872	.743	.615	.486	.229
57½	.297	.871	.743	.614	.486	.229
5 00	2.297	2.871	5.742	8.614	11.485	17.227
02½	.297	.871	.742	.613	.484	.226
03¾	.297	.871	.742	.613	.484	.226
05	.297	.871	.742	.613	.484	.225
07½	.297	.871	.741	.612	.483	.224
10	2.296	2.871	5.741	8.612	11.482	17.223
11¼	.296	.870	.741	.611	.482	.222
12½	.296	.870	.741	.611	.481	.222
15	.296	.870	.740	.610	.480	.221
17½	.296	.870	.740	.610	.480	.220
18¾	.296	.870	.740	.609	.479	.219
20	2.296	2.870	5.739	8.609	11.479	17.218
22½	.296	.870	.739	.609	.478	.217
25	.295	.869	.739	.608	.477	.216
26¼	.295	.869	.738	.608	.477	.215
27½	.295	.869	.738	.607	.477	.215
30	2.295	2.869	5.738	8.607	11.476	17.214
32½	.295	.869	.738	.606	.475	.213
33¾	.295	.869	.737	.606	.475	.212
35	.295	.869	.737	.606	.474	.211
37½	.295	.868	.737	.605	.473	.210
40	2.294	2.868	5.736	8.604	11.473	17.209
41¼	.294	.868	.736	.604	.472	.208
42½	.294	.868	.736	.604	.472	.208
45	.294	.868	.735	.603	.471	.206
47½	.294	.868	.735	.603	.470	.205
48¾	.294	.867	.735	.602	.470	.204
50	2.294	2.867	5.735	8.602	11.469	17.204
52½	.294	.867	.734	.601	.468	.203
55	.293	.867	.734	.601	.468	.201
56¼	.293	.867	.734	.600	.467	.201
57½	.293	.867	.733	.600	.467	.200
6 00	2.293	2.866	5.733	8.599	11.466	17.199

Ordinates of developed parallel and meridional distances: Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
′	*Inches*	*Inch*
For latitude 4°: 1¼	2.863	0.000
2½	5.726	.000
3¾	8.588	.000
5	11.451	.001
6¼	14.314	.001
7½	17.177	.001
10	22.902	.002
12½	28.628	.004
15	34.353	.005
For latitude 5°: 1¼	2.863	0.000
2½	5.726	.000
3¾	8.589	.000
5	11.451	.001
6¼	14.314	.001
7½	17.177	.002
10	22.903	.003
12½	28.629	.005
15	34.354	.007
For latitude 6°: 1¼	2.863	0.000
2½	5.726	.000
3¾	8.589	.000
5	11.452	.001
6¼	14.315	.001
7½	17.178	.002
10	22.904	.003
12½	28.630	.005
15	34.356	.008

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel					
		Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
6	00	2.293	2.866	5.733	8.599	11.466	17.199
	02½	.293	.866	.732	.599	.465	.197
	03¾	.293	.866	.732	.598	.464	.197
	05	.293	.866	.732	.598	.464	.196
	07½	.293	.866	.732	.597	.463	.195
	10	2.292	2.866	5.731	8.597	11.462	17.193
	11¼	.292	.865	.731	.596	.462	.193
	12½	.292	.865	.731	.596	.461	.192
	15	.292	.865	.730	.595	.460	.191
	17½	.292	.865	.730	.595	.460	.189
	18¾	.292	.865	.730	.594	.459	.189
	20	2.292	2.865	5.729	8.594	11.459	17.188
	22½	.292	.864	.729	.593	.458	.187
	25	.291	.864	.728	.593	.457	.185
	26¼	.291	.864	.728	.592	.456	.185
	27½	.291	.864	.728	.592	.456	.184
	30	2.291	2.864	5.727	8.591	11.455	17.182
	32½	.291	.863	.727	.590	.454	.181
	33¾	.291	.863	.727	.590	.453	.180
	35	.291	.863	.727	.590	.453	.180
	37½	.290	.863	.726	.589	.452	.178
	40	2.290	2.863	5.726	8.588	11.451	17.177
	41¼	.290	.863	.725	.588	.451	.176
	42½	.290	.863	.725	.588	.450	.175
	45	.290	.862	.725	.587	.449	.174
	47½	.290	.862	.724	.586	.448	.172
	48¾	.290	.862	.724	.586	.448	.172
	50	2.289	2.862	5.724	8.585	11.447	17.171
	52½	.289	.862	.723	.585	.446	.169
	55	.289	.861	.723	.584	.445	.168
	56¼	.289	.861	.722	.583	.445	.167
	57½	.289	.861	.722	.583	.444	.166
7	00	2.289	2.861	5.722	8.582	11.443	17.165
	02½	.288	.861	.721	.582	.442	.163
	03¾	.288	.860	.721	.581	.442	.162
	05	.288	.860	.721	.581	.441	.162
	07½	.288	.860	.720	.580	.440	.160
	10	2.288	2.860	5.720	8.579	11 439	17.159
	11¼	.288	.860	.719	.579	.439	.158
	12½	.288	.859	.719	.578	.438	.157
	15	.287	.859	.718	.578	.437	.156
	17½	.287	.859	.718	.577	.436	.154
	18¾	.287	.859	.718	.577	.435	.153
	20	2.287	2.859	5.717	8.576	11.435	17.152
	22½	.287	.858	.717	.575	.434	.151
	25	.287	.858	.716	.575	.433	.149
	26¼	.286	.858	.716	.574	.432	.148
	27½	.286	.858	.716	.574	.432	.147
	30	2.286	2.858	5.715	8.573	11.431	17.146
	32½	.286	.857	.715	.572	.429	.144
	33¾	.286	.857	.714	.572	.429	.143
	35	.286	.857	.714	.571	.428	.143
	37½	.285	.857	.714	.570	.427	.141
	40	2.285	2.857	5.713	8.570	11.426	17.139
	41¼	.285	.856	.713	.569	.426	.138
	42½	.285	.856	.713	.569	.425	.138
	45	.285	.856	.712	.568	.424	.136
	47½	.285	.856	.711	.567	.423	.134
	48¾	.284	.856	.711	.567	.422	.133
	50	2.284	2.855	5.711	8.566	11.422	17.133
	52½	.284	.855	.710	.565	.421	.131
	55	.284	.855	.710	.565	.419	.129
	56¼	.284	.855	.709	.564	.419	.128
	57½	.284	.855	.709	.564	.418	.127
8	00	2.284	2.854	5.709	8.563	11.417	17.126

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 6°	1¼	2.863	0.000
	2½	5.726	.000
	3¾	8.589	.000
	5	11.452	.001
	6¼	14.315	.001
	7½	17.178	.002
	10	22.904	.003
	12½	28.630	.005
	15	34.356	.008
For latitude 7°	1¼	2.863	0.000
	2½	5.726	.000
	3¾	8.589	.001
	5	11.452	.001
	6¼	14.315	.002
	7½	17.179	.002
	10	22.905	.004
	12½	28.631	.006
	15	34.357	.009
For latitude 8°	1¼	2.863	0.000
	2½	5.726	.000
	3¾	8.590	.001
	5	11.453	.001
	6¼	14.316	.002
	7½	17.179	.003
	10	22.906	.005
	12½	28.632	.007
	15	34.359	.010

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
8	00	2.284	2.854	5.709	8.563	11.417	17.126			
	02½	.283	.854	.708	.562	.416	.124	1¼	2.863	0.000
	03¾	.283	.854	.708	.561	.415	.123	2½	5.726	.000
	05	.283	.854	.707	.561	.415	.122	3¾	8.590	.001
	07½	.283	.853	.707	.560	.414	.120	5	11.453	.001
								For latitude 8° 6¼	14.316	.002
	10	2.283	2.853	5.706	8.559	11.412	17.119	7½	17.179	.003
	11¼	.282	.853	.706	.559	.412	.118	10	22.906	.005
	12½	.282	.853	.706	.558	.411	.117	12½	28.632	.007
	15	.282	.853	.705	.558	.410	.115	15	34.359	.010
	17½	.282	.852	.704	.557	.409	.113			
	18¾	.282	.852	.704	.556	.408	.112			
	20	2.282	2.852	5.704	8.556	11.408	17.111			
	22½	.282	.852	.703	.555	.406	.110	1¼	2.863	0.000
	25	.282	.851	.703	.554	.405	.108	2½	5.727	.000
	26¼	.282	.851	.702	.553	.405	.107	3¾	8.590	.001
	27½	.282	.851	.702	.553	.404	.106	5	11.453	.001
								For latitude 9° 6¼	14.317	.002
	30	2.281	2.851	5.701	8.552	11.403	17.104	7½	17.180	.003
	32½	.280	.850	.701	.551	.402	.102	10	22.907	.005
	33¾	.280	.850	.700	.551	.401	.101	12½	28.634	.008
	35	.280	.850	.700	.550	.400	.100	15	34.360	.012
	37½	.280	.850	.699	.549	.399	.099			
	40	2.280	2.849	5.699	8.548	11.398	17.097			
	41¼	.279	.849	.699	.548	.397	.096	1¼	2.864	0.000
	42½	.279	.849	.698	.547	.397	.095	2½	5.727	.000
	45	.279	.849	.698	.546	.395	.093	3¾	8.591	.001
	47½	.279	.848	.697	.545	.394	.091	5	11.454	.001
	48¾	.279	.848	.697	.545	.393	.090	For latitude 10° 6¼	14.318	.002
								7½	17.181	.003
	50	2.279	2.848	5.696	8.545	11.393	17.089	10	22.908	.006
	52½	.278	.848	.696	.544	.391	.087	12½	28.635	.009
	55	.278	.848	.695	.543	.390	.085	15	34.362	.013
	56¼	.278	.847	.695	.542	.389	.084			
	57½	.278	.847	.694	.542	.389	.083			
9	00	2.278	2.847	5.694	8.541	11.388	17.081			
	02½	.277	.847	.693	.540	.386	.079			
	03¾	.277	.846	.693	.539	.386	.078			
	05	.277	.846	.692	.539	.385	.077			
	07½	.277	.846	.692	.538	.384	.075			
	10	2.276	2.846	5.691	8.537	11.382	17.073			
	11¼	.276	.845	.691	.536	.382	.072			
	12½	.276	.845	.690	.536	.381	.071			
	15	.276	.845	.690	.535	.380	.069			
	17½	.276	.845	.689	.534	.378	.067			
	18¾	.275	.844	.689	.533	.378	.066			
	20	2.275	2.844	5.688	8.533	11.377	17.065			
	22½	.275	.844	.688	.532	.376	.063			
	25	.275	.844	.687	.531	.374	.061			
	26¼	.275	.843	.687	.530	.373	.060			
	27½	.275	.843	.686	.530	.373	.059			
	30	2.274	2.843	5.686	8.529	11.371	17.057			
	32½	.274	.843	.685	.528	.370	.055			
	33¾	.274	.842	.685	.527	.369	.054			
	35	.274	.842	.684	.527	.369	.053			
	37½	.273	.842	.684	.526	.367	.051			
	40	2.273	2.841	5.683	8.524	11.366	17.049			
	41¼	.273	.841	.683	.524	.365	.048			
	42½	.273	.841	.682	.523	.365	.047			
	45	.273	.841	.682	.522	.363	.045			
	47½	.272	.840	.681	.521	.362	.043			
	48¾	.272	.840	.680	.521	.361	.041			
	50	2.272	2.840	5.680	8.520	11.360	17.040			
	52½	.272	.840	.679	.519	.359	.038			
	55	.271	.839	.679	.518	.357	.036			
	56¼	.271	.839	.678	.518	.357	.035			
	57½	.271	.839	.678	.517	.356	.034			
10	00	2.271	2.839	5.677	8.516	11.355	17.032			

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances			
		Longitude interval						Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′				
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*		′	*Inches*	*Inch*
10	00	2.271	2.839	5.677	8.516	11.355	17.032	For latitude 10°	1¼	2.864	0.000
	02½	.271	.838	.677	.515	.353	.030		2½	5.727	.000
	03¾	.270	.838	.676	.514	.353	.029		3¾	8.591	.001
	05	.270	.838	.676	.514	.352	.027		5	11.454	.001
	07½	.270	.838	.675	.513	.350	.025		6¼	14.318	.002
									7½	17.181	.003
	10	2.270	2.837	5.674	8.512	11.349	17.023		10	22.908	.006
	11¼	.270	.837	.674	.511	.348	.022		12½	28.635	.009
	12½	.269	.837	.674	.510	.347	.021		15	34.362	.013
	15	.269	.836	.673	.509	.346	.019				
	17½	.269	.836	.672	.508	.344	.016				
	18¾	.269	.836	.672	.508	.344	.115				
	20	2.269	2.836	5.671	8.507	11.343	17.014	For latitude 11°	1¼	2.864	0.000
	22½	.268	.835	.671	.506	.341	.012		2½	5.727	.000
	25	.268	.835	.670	.505	.340	.010		3¾	8.591	.001
	26¼	.268	.835	.670	.504	.339	.009		5	11.455	.002
	27½	.268	.835	.669	.504	.338	.007		6¼	14.319	.002
									7½	17.182	.004
	30	2.267	2.834	5.668	8.503	11.337	17.005		10	22.910	.006
	32½	.267	.834	.668	.501	.335	.003		12½	28.637	.010
	33¾	.267	.834	.667	.501	.334	.002		15	34.365	.014
	35	.267	.833	.667	.500	.334	.001				
	37½	.266	.233	.666	.499	.332	16.998				
	40	2.266	2.833	5.665	8.498	11.331	16.996	For latitude 12°	1¼	2.864	0.000
	41¼	.266	.832	.665	.497	.330	.995		2½	5.728	.000
	42½	.266	.832	.665	.497	.329	.994		3¾	8.592	.001
	45	.266	.832	.664	.496	.328	.991		5	11.456	.002
	47½	.265	.832	.663	.495	.326	.989		6¼	14.320	.003
	48¾	.265	.831	.663	.494	.325	.988		7½	17.183	.004
									10	22.911	.007
	50	2.265	2.831	5.662	8.493	11.324	16.987		12½	28.639	.011
	52½	.265	.831	.661	.492	.323	.984		15	34.367	.015
	55	.264	.830	.661	.491	.321	.982				
	56¼	.264	.830	.660	.490	.320	.981				
	57½	.264	.830	.660	.490	.320	980				
11	00	2.264	2.830	5.659	8.489	11.318	16.977				
	02½	.263	.829	.658	.487	.317	.975				
	03¾	.263	.829	.658	.487	.316	.974				
	05	.263	.829	.657	.486	.315	.972				
	07½	.263	.828	.657	.485	.313	.970				
	10	2.262	2.828	5.656	8.484	11.312	16.968				
	11¼	.262	.828	.655	.483	.311	.966				
	12½	.262	.828	.655	.483	.310	.965				
	15	.262	.827	.654	.481	.308	.963				
	17½	.261	.827	.653	.480	.307	.960				
	18¾	.261	.827	.653	.480	.306	.959				
	20	2.261	2.826	5.653	8.479	11.305	16.958				
	22½	.261	.826	.652	.478	.304	.955				
	25	.260	.825	.651	.476	.302	.953				
	26¼	.260	.825	.651	.476	.301	.952				
	27½	.260	.825	.650	.475	.300	.950				
	30	2.260	2.825	5.649	8.474	11.299	16.948				
	32½	.259	.824	.648	.473	.297	.945				
	33¾	.259	.824	.648	.472	.296	.944				
	35	.259	.824	.648	.471	.295	.943				
	37½	.259	.823	.647	.470	.294	.940				
	40	2.258	2.823	5.646	8.469	11.292	16.938				
	41¼	.258	.823	.646	.468	.291	.937				
	42½	.258	.823	.645	.468	.290	.935				
	45	.258	.822	.644	.466	.289	.933				
	47½	.257	.822	.643	.465	.287	.930				
	48¾	.257	.822	.643	.465	.286	.929				
	50	2.257	2.821	5.643	8.464	11.285	16.928				
	52½	.257	.821	.642	.463	.283	.925				
	55	.256	.820	.641	.461	.282	.923				
	56¼	.256	.820	.640	.461	.281	.921				
	57½	.256	.820	.640	.460	.280	.920				
12	00	2.256	2.820	5.639	8.459	11.278	16.917				

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel					
		Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
12	00	2.256	2.820	5.639	8.459	11.278	16.917
	02½	.255	.819	.638	.457	.276	.915
	03¾	.255	.819	.638	.457	.276	.913
	05	.255	.819	.637	.456	.275	.912
	07½	.255	.818	.637	.455	.273	.910
	10	2.254	2.818	5.636	8.453	11.271	16.907
	11¼	.254	.818	.635	.453	.270	.906
	12½	.254	.817	.635	.452	.270	.904
	15	.254	.817	.634	.451	.268	.902
	17½	.253	.816	.633	.449	.266	.899
	18¾	.253	.816	.633	.449	.265	.898
	20	2.253	2.816	5.632	8.448	11.264	16.896
	22½	.252	.816	.631	.447	.262	.894
	25	.252	.815	.630	.445	.261	.891
	26¼	.252	.815	.630	.445	.260	.890
	27½	.252	.815	.629	.444	.259	.888
	30	2.251	2.814	5.629	8.443	11.257	16.886
	32½	.251	.814	.628	.441	.255	.883
	33¾	.251	.814	.627	.441	.254	.881
	35	.251	.813	.627	.440	.253	.880
	37½	.250	.813	.626	.439	.252	.877
	40	2.250	2.812	5.625	8.437	11.250	16.875
	41¼	.250	.812	.624	.437	.249	.873
	42½	.250	.812	.624	.436	.248	.872
	45	.249	.812	.623	.435	.246	.869
	47½	.249	.811	.622	.433	.244	.866
	48¾	.249	.811	.622	.433	.243	.865
	50	2.248	2.811	5.621	8.432	11.242	16.864
	52½	.248	.810	.620	.430	.241	.861
	55	.248	.810	.619	.429	.239	.858
	56¼	.248	.809	.619	.428	.238	.857
	57½	.247	.809	.618	.428	.237	.855
13	00	2.247	2.809	5.618	8.426	11.235	16.852
	02½	.247	.808	.617	.425	.233	.850
	03¾	.246	.808	.616	.424	.232	.848
	05	.246	.808	.616	.423	.231	.847
	07½	.246	.807	.615	.422	.229	.844
	10	2.246	2.807	5.614	8.421	11.227	16.841
	11¼	.245	.807	.613	.420	.226	.840
	12½	.245	.806	.613	.419	.226	.838
	15	.245	.806	.612	.418	.224	.835
	17½	.244	.805	.611	.416	.222	.833
	18¾	.244	.805	.610	.416	.221	.831
	20	2.244	2.805	5.610	8.415	11.220	16.830
	22½	.244	.804	.609	.413	.218	.827
	25	.243	.804	.608	.412	.216	.824
	26¼	.243	.804	.608	.411	.215	.823
	27½	.243	.804	.607	.411	.214	.821
	30	2.242	2.803	5.606	8.409	11.212	16.818
	32½	.242	.803	.605	.408	.210	.815
	33¾	.242	.802	.605	.407	.209	.814
	35	.242	.802	.604	.406	.208	.812
	37½	.241	.802	.603	.405	.206	.809
	40	2.241	2.801	5.602	8.403	11.204	16.806
	41¼	.241	.801	.602	.402	.203	.805
	42½	.240	.801	.601	.402	.202	.803
	45	.240	.800	.600	.400	.200	.800
	47½	.240	.800	.599	.399	.198	.797
	48¾	.239	.799	.599	.398	.197	.796
	50	2.239	2.799	5.598	8.397	11.196	16.795
	52½	.239	.799	.597	.396	.194	.792
	55	.238	.798	.596	.394	.192	.789
	56¼	.238	.798	.596	.394	.191	.787
	57½	.238	.798	.595	.393	.190	.786
14	00	2.238	2.797	5.594	8.391	11.188	16.782

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 12°	1¼	2.864	0.000
	2½	5.728	.000
	3¾	8.592	.001
	5	11.456	.002
	6¼	14.320	.003
	7½	17.183	.004
	10	22.911	.007
	12½	28.639	.011
	15	34.367	.015
For latitude 13°	1¼	2.864	0.000
	2½	5.728	.000
	3¾	8.592	.001
	5	11.456	.002
	6¼	14.321	.003
	7½	17.185	.004
	10	22.913	.007
	12½	28.641	.011
	15	34.370	.017
For latitude 14°	1¼	2.864	0.000
	2½	5.729	.000
	3¾	8.593	.001
	5	11.457	.002
	6¼	14.322	.003
	7½	17.186	.004
	10	22.915	.008
	12½	28.644	.012
	15	34.372	.018

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel					
		Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
14	00	2.238	2.797	5.594	8.391	11.188	16.782
	02½	.237	.797	.593	.390	.186	.780
	03¾	.237	.796	.593	.389	.185	.778
	05	.237	.796	.592	.388	.184	.776
	07½	.236	.796	.591	.387	.182	.773
	10	2.236	2.795	5.590	8.385	11.180	16.770
	11¼	.236	.795	.590	.384	.179	.769
	12½	.236	.795	.589	.384	.178	.767
	15	.235	.794	.588	.382	.176	.764
	17½	.235	.794	.587	.381	.174	.761
	18¾	.235	.793	.587	.380	.173	.760
	20	2.234	2.793	5.586	8.379	11.172	16.758
	22½	.234	.792	.585	.377	.170	.755
	25	.234	.792	.584	.376	.168	.752
	26¼	.233	.792	.583	.375	.167	.750
	27½	.233	.791	.583	.374	.166	.749
	30	2.233	2.791	5.582	8.373	11.164	16.745
	32½	.232	.790	.581	.371	.162	.742
	33¾	.232	.790	.580	.370	.161	.741
	35	.232	.790	.580	.370	.160	.739
	37½	.232	.789	.579	.368	.157	.736
	40	2.231	2.789	5.578	8.366	11.155	16.733
	41¼	.231	.789	.577	.366	.154	.731
	42½	.231	.788	.577	.365	.153	.730
	45	.230	.788	.576	.363	.151	.727
	47½	.230	.787	.574	.362	.149	.723
	48¾	.230	.787	.574	.361	.148	.722
	50	2.229	2.787	5.573	8.360	11.147	16.720
	52½	.229	.786	.572	.359	.145	.717
	55	.229	.786	.571	.357	.143	.714
	56¼	.228	.785	.571	.356	.141	.712
	57½	.228	.785	.570	.355	.140	.711
15	00	2.228	2.785	5.569	8.354	11.138	16.707
	02½	.227	.784	.568	.352	.136	.704
	03¾	.227	.784	.568	.351	.135	.703
	05	.227	.783	.567	.350	.134	.701
	07½	.226	.783	.566	.349	.132	.698
	10	2.226	2.782	5.565	8.347	11.130	16.694
	11¼	.226	.782	.564	.346	.129	.693
	12½	.225	.782	.564	.346	.127	.691
	15	.225	.781	.563	.344	.125	.688
	17½	.225	.781	.562	.342	.123	.685
	18¾	.224	.780	.561	.341	.122	.683
	20	2.224	2.780	5.560	8.341	11.121	16.681
	22½	.224	.780	.559	.339	.119	.678
	25	.224	.779	.558	.337	.116	.675
	26¼	.223	.779	.558	.336	.115	.673
	27½	.223	.779	.557	.336	.114	.671
	30	2.222	2.778	5.556	8.334	11.112	16.668
	32½	.222	.777	.555	.332	.110	.665
	33¾	.222	.777	.554	.331	.109	.663
	35	.222	.777	.554	.331	.107	.661
	37½	.221	.776	.553	.329	.105	.658
	40	2.221	2.776	5.552	8.327	11.103	16.654
	41¼	.220	.775	.551	.326	.102	.653
	42½	.220	.775	.550	.326	.101	.651
	45	.220	.775	.549	.324	.098	.648
	47½	.219	.774	.548	.322	.096	.644
	48¾	.219	.774	.548	.321	.095	.643
	50	2.219	2.773	5.547	8.320	11.094	16.641
	52½	.218	.773	.546	.319	.092	.637
	55	.218	.772	.545	.317	.089	.634
	56¼	.218	.772	.544	.316	.088	.632
	57½	.217	.772	.544	.315	.087	.631
16	00	2.217	2.771	5.542	8.314	11.085	16.627

Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 14°	1¼	2.864	0.000
	2½	5.729	.000
	3¾	8.593	.001
	5	11.457	.002
	6¼	14.322	.003
	7½	17.186	.004
	10	22.915	.008
	12½	28.644	.012
	15	34.372	.018
For latitude 15°	1¼	2.865	0.000
	2½	5.729	.001
	3¾	8.594	.001
	5	11.458	.002
	6¼	14.323	.003
	7½	17.188	.005
	10	22.917	.008
	12½	28.646	.013
	15	34.375	.019
For latitude 16°	1¼	2.865	0.000
	2½	5.730	.001
	3¾	8.595	.001
	5	11.459	.002
	6¼	14.325	.003
	7½	17.189	.005
	10	22.919	.009
	12½	28.649	.014
	15	34.379	.020

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
16	00	2.217	2.771	5.542	8.314	11.085	16.627			
	02½	.216	.771	.541	.312	.083	.624	1¼	2.865	0.000
	03¾	.216	.770	.541	.311	.081	.622	2½	5.730	.001
	05	.216	.770	.540	.310	.080	.620	3¾	8.595	.001
	07½	.216	.769	.539	.308	.078	.617	5	11.459	.002
								For latitude 16° 6¼	14.325	.003
	10	2.215	2.769	5.538	8.307	11.076	16.613	7½	17.189	.005
	11¼	.215	.769	.537	.306	.074	.612	10	22.919	.009
	12½	.215	.768	.537	.305	.073	.610	12½	28.649	.014
	15	.214	.768	.535	.303	.071	.606	15	34.379	.020
	17½	.214	.767	.534	.301	.069	.603			
	18¾	.213	.767	.534	.301	.067	.601			
	20	2.213	2.767	5.533	8.300	11.066	16.599	1¼	2.865	0.000
	22½	.213	.766	.532	.298	.064	.596	2½	5.730	.001
	25	.212	.765	.531	.296	.062	.592	3¾	8.595	.001
	26¼	.212	.765	.530	.295	.060	.590	5	11.461	.002
	27½	.212	.765	.530	.294	.059	.589	For latitude 17° 6¼	14.326	.004
								7½	17.191	.005
	30	2.211	2.764	5.528	8.293	11.057	16.585	10	22.921	.009
	32½	.211	.764	.527	.291	.054	.582	12½	28.652	.014
	33¾	.211	.763	.527	.290	.053	.580	15	34.382	.021
	35	.210	.763	.526	.289	.052	.578			
	37½	.210	.762	.525	.287	.050	.575			
	40	2.209	2.762	5.524	8.286	11.047	16.571	1¼	2.865	0.000
	41¼	.209	.762	.523	.285	.046	.569	2½	5.731	.001
	42½	.209	.761	.522	.284	.045	.567	3¾	8.596	.001
	45	.208	.761	.521	.282	.043	.564	5	11.462	.002
	47½	.208	.760	.520	.280	.040	.560	For latitude 18° 6¼	14.327	.004
	48¾	.208	.760	.519	.279	.039	.558	7½	17.193	.006
								10	22.923	.010
	50	2.208	2.759	5.519	8.278	11.038	16.557	12½	28.654	.015
	52½	.207	.759	.518	.276	.035	.553	15	34.385	.022
	55	.207	.758	.516	.275	.033	.549			
	56¼	.206	.758	.516	.274	.032	.547			
	57½	.206	.758	.515	.273	.030	.546			
17	00	2.206	2.757	5.514	8.271	11.028	16.542			
	02½	.205	.756	.513	.269	.026	.538			
	03¾	.205	.756	.512	.268	.024	.536			
	05	.205	.756	.512	.267	.023	.535			
	07½	.204	.755	.510	.266	.021	.531			
	10	2.204	2.755	5.509	8.264	11.018	16.527			
	11¼	.203	.754	.509	.263	.017	.526			
	12½	.203	.754	.508	.262	.016	.524			
	15	.203	.753	.507	.260	.013	.520			
	17½	.202	.753	.505	.258	.011	.516			
	18¾	.202	.752	.505	.257	.010	.514			
	20	2.202	2.752	5.504	8.256	11.008	16.512			
	22½	.201	.751	.503	.254	.006	.509			
	25	.201	.751	.502	.253	.003	.505			
	26¼	.200	.751	.501	.252	.002	.503			
	27½	.200	.750	.500	.251	.001	.501			
	30	2.200	2.750	5.499	8.249	10.998	16.498			
	32½	.199	.749	.498	.247	.996	.494			
	33¾	.199	.749	.497	.246	.995	.492			
	35	.199	.748	.497	.245	.993	.490			
	37½	.198	.748	.495	.243	.991	.486			
	40	2.198	2.747	5.494	8.241	10.988	16.482			
	41¼	.197	.747	.494	.240	.987	.481			
	42½	.197	.746	.493	.239	.986	.479			
	45	.197	.746	.492	.237	.983	.475			
	47½	.196	.745	.490	.235	.981	.471			
	48¾	.196	.745	.490	.235	.979	.469			
	50	2.196	2.745	5.489	8.234	10.978	16.467			
	52½	.195	.744	.488	.232	.976	.463			
	55	.195	.743	.486	.230	.973	.459			
	56¼	.194	.743	.486	.229	.972	.458			
	57½	.194	.743	.485	.228	.970	.456			
18	00	2.194	2.742	5.484	8.226	10.968	16.452			

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel					
		Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
18	00	2.194	2.742	5.484	8.226	10.968	16.452
	02½	.193	.741	.483	.224	.965	.448
	03¾	.193	.741	.482	.223	.964	.446
	05	.193	.741	.481	.222	.963	.444
	07½	.192	.740	.480	.220	.960	.440
	10	2.191	2.739	5.479	8.218	10.958	16.436
	11¼	.191	.739	.478	.217	.956	.434
	12½	.191	.739	.477	.216	.955	.432
	15	.190	.738	.476	.214	.952	.428
	17½	.190	.737	.475	.212	.950	.424
	18¾	.190	.737	.474	.211	.948	.423
	20	2.189	2.737	5.474	8.210	10.947	16.421
	22½	.189	.736	.472	.208	.944	.417
	25	.188	.735	.471	.206	.942	.413
	26¼	.188	.735	.470	.205	.941	.411
	27½	.188	.735	.470	.204	.939	.409
	30	2.187	2.734	5.468	8.202	10.937	16.405
	32½	.187	.733	.467	.200	.934	.401
	33¾	.187	.733	.466	.199	.933	.399
	35	.186	.733	.466	.198	.931	.397
	37½	.186	.732	.464	.196	.929	.393
	40	2.185	2.731	5.463	8.194	10.926	16.389
	41¼	.185	.731	.462	.193	.925	.387
	42½	.185	.731	.462	.192	.923	.385
	45	.184	.730	.460	.190	.921	.381
	47½	.184	.729	.459	.188	.918	.377
	48¾	.183	.729	.458	.187	.917	.375
	50	2.183	2.729	5.458	8.186	10.915	16.373
	52½	.183	.728	.456	.184	.913	.369
	55	.182	.727	.455	.182	.910	.365
	56¼	.182	.727	.454	.181	.908	.363
	57½	.181	.727	.454	.180	.907	.361
19	00	2.181	2.726	5.452	8.178	10.904	16.357
	02½	.180	.725	.451	.176	.902	.353
	03¾	.180	.725	.450	.175	.900	.350
	05	.180	.725	.449	.174	.899	.348
	07½	.179	.724	.448	.172	.896	.344
	10	2.179	2.723	5.447	8.170	10.893	16.340
	11¼	.178	.723	.446	.169	.892	.338
	12½	.178	.723	.445	.168	.891	.336
	15	.178	.722	.444	.166	.888	.332
	17½	.177	.721	.443	.164	.885	.328
	18¾	.177	.721	.442	.163	.884	.326
	20	2.177	2.721	5.441	8.162	10.883	16.324
	22½	.176	.720	.440	.160	.880	.320
	25	.175	.719	.438	.158	.877	.315
	26¼	.175	.719	.438	.157	.876	.313
	27½	.175	.719	.437	.156	.874	.311
	30	2.174	2.718	5.436	8.154	10.871	16.307
	32½	.174	.717	.434	.151	.869	.303
	33¾	.173	.717	.434	.150	.867	.301
	35	.173	.716	.433	.149	.866	.299
	37½	.173	.716	.431	.147	.863	.294
	40	2.172	2.715	5.430	8.145	10.860	16.290
	41¼	.172	.715	.429	.144	.859	.288
	42½	.172	.714	.429	.143	.857	.286
	45	.171	.714	.427	.141	.855	.282
	47½	.170	.713	.426	.139	.852	.278
	48¾	.170	.713	.425	.138	.850	.276
	50	2.170	2.712	5.424	8.137	10.849	16.273
	52½	.169	.712	.423	.135	.846	.269
	55	.169	.711	.422	.132	.843	.265
	56¼	.168	.710	.421	.131	.842	.263
	57½	.168	.710	.420	.130	.840	.261
20	00	2.167	2.709	5.419	8.128	10.838	16.256

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 18°	1¼	2.865	0.000
	2½	5.731	.001
	3¾	8.596	.001
	5	11.462	.002
	6¼	14.327	.004
	7½	17.193	.006
	10	22.923	.010
	12½	28.654	.015
	15	34.385	.022
For latitude 19°	1¼	2.866	0.000
	2½	5.731	.001
	3¾	8.597	.001
	5	11.463	.003
	6¼	14.329	.004
	7½	17.194	.006
	10	22.926	.010
	12½	28.657	.016
	15	34.389	.023
For latitude 20°	1¼	2.866	0.000
	2½	5.732	.001
	3¾	8.598	.002
	5	11.464	.003
	6¼	14.330	.004
	7½	17.196	.006
	10	22.929	.011
	12½	28.661	.017
	15	34.393	.024

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
20	00	2.167	2.709	5.419	8.128	10.838	16.256			
	02½	.167	.709	.417	.126	.835	.252	1¼	2.866	0.000
	03¾	.167	.708	.417	.125	.833	.250	2½	5.732	.001
	05	.166	.708	.416	.124	.832	.248	3¾	8.598	.002
	07½	.166	.707	.414	.122	.829	.243	5	11.464	.003
								For latitude 20° 6¼	14.330	.004
	10	2.165	2.707	5.413	8.120	10.826	16.239	7½	17.196	.006
	11¼	.165	.706	.412	.119	.825	.237	10	22.929	.011
	12½	.165	.706	.412	.117	.823	.235	12½	28.661	.017
	15	.164	.705	.410	.115	.820	.231	15	34.393	.024
	17½	.163	.704	.409	.113	.817	.226			
	18¾	.163	.704	.408	.112	.816	.224			
								1¼	2.866	0.000
	20	2.163	2.704	5.407	8.111	10.815	16.222	2½	5.733	.001
	22½	.162	.703	.406	.109	.812	.217	3¾	8.599	.002
	25	.162	.702	.404	.107	.809	.213	5	11.466	.003
	26¼	.161	.702	.404	.105	.807	.211	For latitude 21° 6¼	14.332	.004
	27½	.161	.701	.403	.104	.806	.209	7½	17.198	.006
								10	22.931	.011
	30	2.161	2.701	5.401	8.102	10.803	16.204	12½	28.664	.018
	32½	.160	.700	.400	.100	.800	.200	15	34.397	.025
	33¾	.160	.700	.399	.099	.799	.198			
	35	.159	.699	.399	.098	.797	.196			
	37½	.159	.699	.397	.096	.794	.191			
								1¼	2.867	0.000
	40	2.158	2.698	5.396	8.093	10.791	16.187	2½	5.733	.001
	41¼	.158	.697	.395	.092	.790	.185	3¾	8.600	.002
	42½	.158	.697	.394	.091	.788	.182	5	11.467	.003
	45	.157	.696	.393	.089	.785	.178	For latitude 22° 6¼	14.334	.005
	47½	.156	.696	.391	.087	.782	.174	7½	17.201	.007
	48¾	.156	.695	.390	.086	.781	.171	10	22.934	.012
								12½	28.668	.018
	50	2.156	2.695	5.390	8.085	10.779	16.169	15	34.401	.026
	52½	.155	.694	.388	.082	.776	.165			
	55	.155	.693	.387	.080	.773	.160			
	56¼	.154	.693	.386	.079	.772	.158			
	57½	.154	.693	.385	.079	.770	.156			
21	00	2.154	2.692	5.384	8.076	10.768	16.151			
	02½	.153	.691	.382	.073	.764	.147			
	03¾	.153	.691	.382	.072	.763	.145			
	05	.152	.690	.381	.071	.762	.142			
	07½	.152	.690	.379	.069	.759	.138			
	10	2.151	2.689	5.378	8.067	10.756	16.133			
	11¼	.151	.688	.377	.066	.754	.131			
	12½	.150	.688	.376	.064	.752	.129			
	15	.150	.687	.375	.062	.749	.124			
	17½	.149	.687	.373	.060	.746	.120			
	18¾	.149	.686	.372	.059	.745	.117			
	20	2.149	2.686	5.372	8.058	10.743	16.115			
	22½	.148	.685	.370	.055	.740	.111			
	25	.147	.684	.369	.053	.737	.106			
	26¼	.147	.684	.368	.052	.736	.104			
	27½	.147	.684	.367	.051	.734	.102			
	30	2.146	2.683	5.366	8.048	10.731	16.097			
	32½	.146	.682	.364	.046	.728	.092			
	33¾	.145	.682	.363	.045	.727	.090			
	35	.145	.681	.363	.044	.725	.088			
	37½	.144	.681	.361	.042	.722	.083			
	40	2.144	2.680	5.359	8.039	10.719	16.078			
	41¼	.144	.679	.359	.038	.717	.076			
	42½	.143	.679	.358	.037	.716	.074			
	45	.143	.678	.356	.035	.713	.069			
	47½	.142	.677	.355	.032	.710	.065			
	48¾	.142	.677	.354	.031	.708	.062			
	50	2.141	2.677	5.353	8.030	10.707	16.060			
	52½	.141	.676	.352	.028	.703	.055			
	55	.140	.675	.350	.025	.700	.051			
	56¼	.140	.675	.349	.024	.699	.048			
	57½	.140	.674	.349	.023	.697	.046			
22	00	2.139	2.674	5.347	8.021	10.694	16.041			

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel					
		Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
22	00	2.139	2.674	5.347	8.021	10.694	16.041
	02½	.138	.673	.346	.018	.691	.037
	03¾	.138	.672	.345	.017	.690	.034
	05	.138	.672	.344	.016	.688	.032
	07½	.137	.671	.342	.014	.685	.027
	10	2.136	2.670	5.341	8.011	10.682	16.022
	11¼	.136	.670	.340	.010	.680	.020
	12½	.136	.670	.339	.009	.678	.018
	15	.135	.669	.338	.006	.675	.013
	17½	.134	.668	.336	.004	.672	.008
	18¾	.134	.668	.335	.003	.671	.006
	20	2.134	2.667	5.334	8.002	10.669	16.003
	22½	.133	.666	.333	7.999	.666	15.999
	25	.133	.666	.331	.997	.663	.994
	26¼	.132	.665	.331	.996	.661	.992
	27½	.132	.665	.330	.995	.659	.989
	30	2.131	2.664	5.328	7.992	10.656	15.984
	32½	.131	.663	.327	.990	.653	.980
	33¾	.130	.663	.326	.989	.652	.977
	35	.130	.662	.325	.987	.650	.975
	37½	.129	.662	.323	.985	.647	.970
	40	2.129	2.661	5.322	7.983	10.643	15.965
	41¼	.128	.660	.321	.981	.642	.963
	42½	.128	.660	.320	.980	.640	.960
	45	.127	.659	.319	.978	.637	.956
	47½	.127	.658	.317	.975	.634	.951
	48¾	.126	.658	.316	.974	.632	.948
	50	2.126	2.658	5.315	7.973	10.631	15.946
	52½	.125	.657	.314	.970	.627	.941
	55	.125	.656	.312	.968	.624	.936
	56¼	.124	.656	.311	.967	.622	.934
	57½	.124	.655	.310	.966	.621	.931
23	00	2.123	2.654	5.309	7.963	10.618	15.926
	02½	.123	.654	.307	.961	.614	.921
	03¾	.123	.653	.306	.960	.613	.919
	05	.122	.653	.306	.958	.611	.917
	07½	.122	.652	.304	.956	.608	.912
	10	2.121	2.651	5.302	7.953	10.605	15.907
	11¼	.121	.651	.301	.952	.603	.904
	12½	.120	.650	.301	.951	.601	.902
	15	.120	.649	.299	.948	.598	.897
	17½	.119	.649	.297	.946	.595	.892
	18¾	.119	.648	.297	.945	.593	.890
	20	2.118	2.648	5.296	7.944	10.591	15.887
	22½	.118	.647	.294	.941	.588	.882
	25	.117	.646	.292	.939	.585	.877
	26¼	.117	.646	.292	.937	.583	.875
	27½	.116	.645	.291	.936	.581	.872
	30	2.116	2.645	5.289	7.934	10.578	15.867
	32½	.115	.644	.287	.931	.575	.862
	33¾	.115	.643	.287	.930	.573	.860
	35	.114	.643	.286	.929	.571	.857
	37½	.114	.642	.284	.926	.568	.852
	40	2.113	2.641	5.282	7.924	10.565	15.847
	41¼	.113	.641	.282	.922	.563	.845
	42½	.112	.640	.281	.921	.561	.842
	45	.112	.640	.279	.919	.558	.837
	47½	.111	.639	.277	.916	.555	.832
	48¾	.111	.638	.277	.915	.553	.830
	50	2.110	2.638	5.276	7.913	10.551	15.827
	52½	.110	.637	.274	.911	.548	.822
	55	.109	.636	.272	.908	.545	.817
	56¼	.109	.636	.271	.907	.543	.814
	57½	.108	.635	.271	.906	.541	.812
24	00	2.108	2.634	5.269	7.903	10.538	15.807

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 22°	1¼	2.867	0.000
	2½	5.733	.001
	3¾	8.600	.002
	5	11.467	.003
	6¼	14.334	.005
	7½	17.201	.007
	10	22.934	.012
	12½	28.668	.018
	15	34.401	.026
For latitude 23°	1¼	2.867	0.000
	2½	5.734	.001
	3¾	8.601	.002
	5	11.468	.003
	6¼	14.336	.005
	7½	17.203	.007
	10	22.937	.012
	12½	28.672	.019
	15	34.405	.027
For latitude 24°	1¼	2.867	0.000
	2½	5.735	.001
	3¾	8.602	.002
	5	11.470	.003
	6¼	14.338	.005
	7½	17.205	.007
	10	22.940	.012
	12½	28.675	.019
	15	34.410	.028

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
24	00	2.108	2.634	5.269	7.903	10.538	15.807			
	02½	.107	.634	.267	.901	.534	.802	1¼	2.867	0.000
	03¾	.107	.633	.266	.899	.533	.799	2½	5.735	.001
	05	.106	.633	.265	.898	.531	.796	3¾	8.602	.002
	07½	.105	.632	.264	.896	.527	.791	5	11.470	.003
								For latitude 24° 6¼	14.338	.005
	10	2.105	2.631	5.262	7.893	10.524	15.786	7½	17.205	.007
	11¼	.104	.631	.261	.892	.522	.784	10	22.940	.012
	12½	.104	.630	.260	.891	.521	.781	12½	28.675	.019
	15	.103	.629	.259	.888	.517	.776	15	34.410	.028
	17½	.103	.629	.257	.885	.514	.771			
	18¾	.102	.628	.256	.884	.512	.768			
	20	2.102	2.628	5.255	7.883	10.510	15.766			
	22½	.101	.628	.254	.880	.507	.760	1¼	2.868	0.000
	25	.101	.626	.252	.878	.504	.755	2½	5.736	.001
	26¼	.100	.625	.251	.876	.502	.753	3¾	8.604	.002
	27½	.100	.625	.250	.875	.500	.750	5	11.471	.003
								For latitude 25° 6¼	14.340	.005
	30	2.099	2.624	5.248	7.872	10.497	15.745	7½	17.207	.007
	32½	.099	.623	.247	.870	.493	.740	10	22.943	.013
	33¾	.098	.623	.246	.869	.491	.737	12½	28.679	.020
	35	.098	.622	.245	.867	.490	.735	15	34.415	.029
	37½	.097	.622	.243	.865	.486	.729			
	40	2.097	2.621	5.241	7.862	10.483	15.724			
	41¼	.096	.620	.241	.861	.481	.722	1¼	2.868	0.000
	42½	.096	.620	.240	.859	.479	.719	2½	5.736	.001
	45	.095	.619	.238	.857	.476	.714	3¾	8.605	.002
	47½	.095	.618	.236	.854	.472	.708	5	11.473	.003
	48¾	.094	.618	.235	.853	.471	.706	For latitude 26° 6¼	14.342	.005
								7½	17.210	.007
	50	2.094	2.617	5.234	7.852	10.469	15.703	10	22.946	.013
	52½	.093	.616	.233	.849	.465	.690	12½	28.683	.021
	55	.092	.615	.231	.846	.462	.693	15	34.419	.030
	56¼	.092	.615	.230	.845	.460	.690			
	57½	.092	.615	.229	.844	.458	.687			
25	00	2.091	2.614	5.227	7.841	10.455	15.682			
	02½	.090	.613	.226	.838	.451	.677			
	03¾	.090	.612	.225	.837	.449	.674			
	05	.090	.612	.224	.836	.448	.672			
	07½	.089	.611	.222	.833	.444	.666			
	10	2.088	2.610	5.220	7.830	10.441	15.661			
	11¼	.088	.610	.219	.829	.439	.658			
	12½	.087	.609	.219	.828	.437	.656			
	15	.087	.608	.217	.825	.433	.650			
	17½	.086	.608	.215	.822	.430	.645			
	18¾	.086	.607	.214	.821	.428	.642			
	20	2.085	2.607	5.213	7.820	10.426	15.640			
	22½	.085	.606	.211	.817	.423	.634			
	25	.084	.605	.210	.814	.419	.629			
	26¼	.083	.604	.209	.813	.417	.626			
	27½	.083	.604	.208	.812	.416	.623			
	30	2.082	2.603	5.206	7.809	10.412	15.618			
	32½	.082	.602	.204	.806	.408	.613			
	33¾	.081	.602	.203	.805	.407	.610			
	35	.081	.601	.202	.804	.405	.607			
	37½	.080	.600	.201	.801	.401	.602			
	40	2.079	2.599	5.199	7.798	10.398	15.596			
	41¼	.079	.599	.198	.797	.396	.594			
	42½	.079	.598	.197	.795	.394	.591			
	45	.078	.598	.195	.793	.390	.585			
	47½	.077	.597	.193	.790	.387	.580			
	48¾	.077	.596	.192	.789	.385	.577			
	50	2.077	2.596	5.192	7.787	10.383	15.575			
	52½	.076	.595	.190	.785	.379	.569			
	55	.075	.594	.188	.782	.376	.564			
	56¼	.075	.593	.187	.781	.374	.561			
	57½	.074	.593	.186	.779	.372	.558			
26	00	2.074	2.592	5.184	7.776	10.369	15.553			

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
26	00	2.074	2.592	5.184	7.776	10.369	15.553			
	02½	.073	.591	.182	.774	.365	.547	1¼	2.868	0.000
	03¾	.073	.591	.182	.772	.363	.545	2½	5.736	.001
	05	.072	.590	.181	.771	.361	.542	3¾	8.605	.002
	07½	.072	.589	.179	.768	.358	.536	5	11.473	.003
								For latitude 26° 6¼	14.342	.005
								7½	17.210	.007
	10	2.071	2.588	5.177	7.765	10.354	15.531	10	22.946	.013
	11¼	.070	.588	.176	.764	.352	.528	12½	28.683	.021
	12½	.070	.588	.175	.763	.350	.525	15	34.419	.030
	15	.069	.587	.173	.760	.346	.520			
	17½	.069	.586	.171	.757	.343	.514			
	18¾	.068	.585	.170	.756	.341	.511			
								1¼	2.869	0.000
	20	2.068	2.585	5.170	7.754	10.339	15.509	2½	5.737	.001
	22½	.067	.584	.168	.752	.335	.503	3¾	8.606	.002
	25	.066	.583	.166	.749	.332	.498	5	11.475	.003
	26¼	.066	.582	.165	.747	.330	.495	For latitude 27° 6¼	14.344	.005
	27½	.066	.582	.164	.746	.328	.492	7½	17.212	.008
								10	22.949	.014
	30	2.065	2.581	5.162	7.743	10.324	15.486	12½	28.687	.021
	32½	.064	.580	.160	.740	.321	.481	15	34.424	.031
	33¾	.064	.580	.159	.739	.319	.478			
	35	.063	.579	.158	.738	.317	.475			
	37½	.063	.578	.157	.735	.313	.470			
								1¼	2.869	0.000
	40	2.062	2.577	5.155	7.732	10.309	15.464	2½	5.738	.001
	41¼	.061	.577	.154	.731	.307	.461	3¾	8.607	.002
	42½	.061	.576	.153	.729	.306	.458	5	11.476	.003
	45	.060	.575	.151	.726	.302	.453	For latitude 28° 6¼	14.346	.005
	47½	.060	.575	.149	.724	.298	.447	7½	17.215	.008
	48¾	.059	.574	.148	.722	.296	.444	10	22.953	.014
								12½	28.691	.022
	50	2.059	2.574	5.147	7.721	10.294	15.441	15	34.429	.031
	52½	.058	.573	.145	.718	.291	.436			
	55	.058	.572	.143	.715	.287	.430			
	56¼	.057	.571	.142	.714	.285	.427			
	57½	.057	.571	.141	.712	.283	.424			
27	00	2.056	2.570	5.140	7.709	10.279	15.419			
	02½	.055	.569	.138	.707	.275	.413			
	03¾	.055	.568	.137	.705	.274	.410			
	05	.054	.568	.136	.704	.272	.407			
	07½	.054	.567	.134	.701	.268	.402			
	10	2.053	2.566	5.132	7.698	10.264	15.396			
	11¼	.052	.566	.131	.697	.262	.393			
	12½	.052	.565	.130	.695	.260	.390			
	15	.051	.564	.128	.692	.256	.385			
	17½	.051	.563	.126	.689	.253	.379			
	18¾	.050	.563	.125	.688	.251	.376			
	20	2.050	2.562	5.124	7.687	10.249	15.373			
	22½	.049	.561	.122	.684	.245	.367			
	25	.048	.560	.121	.681	.241	.362			
	26¼	.048	.560	.120	.679	.239	.359			
	27½	.047	.559	.119	.678	.237	.356			
	30	2.047	2.558	5.117	7.675	10.233	15.350			
	32½	.046	.557	.115	.672	.229	.344			
	33¾	.046	.557	.114	.671	.228	.341			
	35	.045	.556	.113	.669	.226	.338			
	37½	.044	.555	.111	.666	.222	.333			
	40	2.044	2.554	5.109	7.663	10.218	15.327			
	41¼	.043	.554	.108	.662	.216	.324			
	42½	.043	.553	.107	.660	.214	.321			
	45	.042	.553	.105	.658	.210	.315			
	47½	.041	.552	.103	.655	.206	.309			
	48¾	.041	.551	.102	.653	.204	.306			
	50	2.041	2.551	5.101	7.652	10.202	15.304			
	52½	.040	.550	.100	.649	.198	.298			
	55	.039	.549	.097	.646	.195	.292			
	56¼	.039	.548	.096	.644	.193	.289			
	57½	.038	.548	.095	.643	.191	.286			
28	00	2.037	2.547	5.093	7.640	10.187	15.280			

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances			
		Longitude interval						Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′				
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*		′	*Inches*	*Inch*
28	00	2.037	2.547	5.093	7.640	10.187	15.280	For latitude 28°	1¼	2.869	0.000
	02½	.037	.546	.091	.637	.183	.274		2½	5.738	.001
	03¾	.036	.545	.090	.636	.181	.271		3¾	8.607	.002
	05	.036	.545	.089	.634	.179	.268		5	11.476	.003
	07½	.035	.544	.088	.631	.175	.262		6¼	14.346	.005
									7½	17.215	.008
	10	2.034	2.543	5.085	7.628	10.171	15.256		10	22.953	.014
	11¼	.034	.542	.085	.627	.169	.254		12½	28.691	.022
	12½	.033	.542	.084	.625	.167	.251		15	34.429	.031
	15	.033	.541	.082	.622	.163	.245				
	17½	.032	.540	.080	.619	.159	.239				
	18¾	.031	.539	.079	.618	.157	.236				
	20	2.031	2.539	5.078	7.616	10.155	15.233	For latitude 29°	1¼	2.869	0.000
	22½	.030	.538	.076	.613	.151	.227		2½	5.739	.001
	25	.029	.537	.074	.610	.147	.221		3¾	8.609	.002
	26¼	.029	.536	.073	.609	.145	.218		5	11.478	.004
	27½	.029	.536	.072	.607	.143	.215		6¼	14.348	.006
									7½	17.217	.008
	30	2.028	2.535	5.070	7.604	10.139	15.209		10	22.956	.014
	32½	.027	.534	.068	.601	.135	.203		12½	28.696	.022
	33¾	.027	.533	.067	.600	.133	.200		15	34.434	.032
	35	.026	.533	.066	.598	.131	.197				
	37½	.025	.532	.064	.596	.127	.191				
	40	2.025	2.531	5.062	7.593	10.123	15.185	For latitude 30°	1¼	2.870	0.000
	41¼	.024	.530	.061	.591	.121	.182		2½	5.740	.001
	42½	.024	.530	.060	.590	.119	.179		3¾	8.611	.002
	45	.023	.529	.058	.586	.115	.173		5	11.480	.004
	47½	.022	.528	.056	.583	.111	.167		6¼	14.350	.006
	48¾	.022	.527	.055	.582	.109	.164		7½	17.220	.008
									10	22.960	.015
	50	2.021	2.527	5.054	7.580	10.107	15.161		12½	28.700	.023
	52½	.021	.526	.052	.577	.103	.155		15	34.440	.033
	55	.020	.525	.050	.574	.099	.149				
	56¼	.019	.524	.049	.573	.097	.146				
	57½	.019	.524	.048	.571	.095	.143				
29	00	2.018	2.523	5.046	7.568	10.091	15.137				
	02½	.017	.522	.044	.565	.087	.131				
	03¾	.017	.521	.043	.564	.085	.127				
	05	.017	.521	.042	.562	.083	.125				
	07½	.016	.520	.039	.559	.079	.118				
	10	2.015	2.519	5.037	7.556	10.075	15.112				
	11¼	.015	.518	.036	.555	.073	.109				
	12½	.014	.518	.035	.553	.071	.106				
	15	.013	.517	.033	.550	.067	.100				
	17½	.012	.516	.031	.547	.063	.094				
	18¾	.012	.515	.030	.545	.061	.091				
	20	2.012	2.515	5.029	7.544	10.059	15.088				
	22½	.011	.514	.027	.541	.055	.082				
	25	.010	.513	.025	.538	.050	.076				
	26¼	.010	.512	.024	.536	.048	.073				
	27½	.009	.512	.023	.535	.046	.069				
	30	2.008	2.511	5.021	7.532	10.042	15.063				
	32½	.008	.509	.019	.529	.038	.057				
	33¾	.007	.509	.018	.527	.036	.054				
	35	.007	.508	.017	.525	.034	.051				
	37½	.006	.507	.015	.522	.030	.045				
	40	2.005	2.506	5.013	7.519	10.026	15.039				
	41¼	.005	.506	.012	.518	.024	.035				
	42½	.004	.505	.011	.516	.022	.032				
	45	.003	.504	.009	.513	.017	.026				
	47½	.003	.503	.007	.510	.013	.020				
	48¾	.002	.503	.006	.508	.011	.017				
	50	2.002	2.502	5.005	7.507	10.009	15.014				
	52½	.001	.501	.003	.504	.005	.007				
	55	.000	.500	.000	.501	.001	.001				
	56¼	.000	.500	4.999	.499	9.999	14.998				
	57½	1.999	.499	.998	.497	.997	.995				
30	00	1.998	2.498	4.996	7.494	9.992	14.989				

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval						Ordinates of developed parallel and meridional distances		
		1′	1¼′	2½′	3¾′	5′	7½′	Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
30	00	1.998	2.498	4.996	7.494	9.992	14.989			
	02½	.998	.497	.994	.491	.988	.982			
	03¾	.997	.497	.993	.490	.986	.979			
	05	.997	.496	.992	.488	.984	.976			
	07½	.996	.495	.990	.485	.980	.970			
	10	1.995	2.494	4.988	7.482	9.976	14.964			
	11¼	.995	.493	.987	.480	.974	.960			
	12½	.994	.493	.986	.479	.971	.957			
	15	.993	.492	.984	.476	.967	.951			
	17½	.993	.491	.982	.472	.963	.945			
	18¾	.992	.490	.981	.471	.961	.942			
	20	1.992	2.490	4.979	7.469	9.959	14.938			
	22½	.991	.489	.977	.466	.955	.932			
	25	.990	.488	.975	.463	.950	.926			
	26¼	.990	.487	.974	.461	.948	.923			
	27½	.989	.487	.973	.460	.946	.919			
	30	1.988	2.486	4.971	7.457	9.942	14.913			
	32½	.988	.484	.969	.453	.938	.907			
	33¾	.987	.484	.968	.452	.936	.903			
	35	.987	.483	.967	.450	.934	.900			
	37½	.986	.482	.965	.447	.929	.894			
	40	1.985	2.481	4.963	7.444	9.925	14.888			
	41¼	.985	.481	.961	.442	.923	.884			
	42½	.984	.480	.960	.441	.921	.881			
	45	.983	.479	.958	.437	.916	.875			
	47½	.982	.478	.956	.434	.912	.868			
	48¾	.982	.478	.955	.433	.910	.865			
	50	1.982	2.477	4.954	7.431	9.908	14.862			
	52½	.981	.476	.952	.428	.904	.856			
	55	.980	.475	.950	.425	.899	.849			
	56¼	.979	.474	.949	.423	.897	.846			
	57½	.979	.474	.948	.421	.895	.843			
31	00	1.978	2.473	4.945	7.418	9.891	14.836			
	02½	.977	.472	.943	.415	.886	.830			
	03¾	.977	.471	.942	.413	.884	.827			
	05	.976	.471	.941	.412	.882	.823			
	07½	.976	.469	.939	.408	.878	.817			
	10	1.975	2.468	4.937	7.405	9.874	14.810			
	11¼	.974	.468	.936	.403	.871	.807			
	12½	.974	.467	.935	.402	.869	.804			
	15	.973	.466	.932	.399	.865	.797			
	17½	.972	.465	.930	.395	.861	.791			
	18¾	.972	.465	.929	.394	.858	.787			
	20	1.971	2.464	4.928	7.392	9.856	14.784			
	22½	.970	.463	.926	.389	.852	.778			
	25	.969	.462	.924	.386	.848	.771			
	26¼	.969	.461	.923	.384	.845	.768			
	27½	.969	.461	.921	.382	.843	.765			
	30	1.968	2.460	4.919	7.379	9.839	14.758			
	32½	.967	.459	.917	.376	.834	.752			
	33¾	.967	.458	.916	.374	.832	.748			
	35	.966	.458	.915	.373	.830	.745			
	37½	.965	.456	.913	.369	.826	.739			
	40	1.964	2.455	4.911	7.366	9.821	14.732			
	41¼	.964	.455	.910	.364	.819	.729			
	42½	.963	.454	.908	.363	.817	.725			
	45	.963	.453	.906	.359	.813	.719			
	47½	.962	.452	.904	.356	.808	.712			
	48¾	.961	.451	.903	.354	.806	.709			
	50	1.961	2.451	4.902	7.353	9.804	14.706			
	52½	.960	.450	.900	.349	.799	.699			
	55	.959	.449	.897	.346	.795	.692			
	56¼	.959	.448	.896	.345	.793	.689			
	57½	.958	.448	.895	.343	.790	.686			
32	00	1.957	2.447	4.893	7.340	9.786	14.679			

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 30°	1¼	2.870	0.000
	2½	5.740	.001
	3¾	8.611	.002
	5	11.480	.004
	6¼	14.350	.006
	7½	17.220	.008
	10	22.960	.015
	12½	28.700	.023
	15	34.440	.033
For latitude 31°	1¼	2.870	0.000
	2½	5.741	.001
	3¾	8.611	.002
	5	11.482	.004
	6¼	14.352	.006
	7½	17.223	.008
	10	22.963	.015
	12½	28.704	.023
	15	34.445	.033
For latitude 32°	1¼	2.871	0.000
	2½	5.742	.001
	3¾	8.613	.002
	5	11.483	.004
	6¼	14.355	.006
	7½	17.225	.008
	10	22.967	.015
	12½	28.709	.024
	15	34.450	.034

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
32	00	1.957	2.447	4.893	7.340	9.786	14.679			
	02½	.956	.445	.891	.336	.782	.672			
	03¾	.956	.445	.890	.335	.779	.669			
	05	.955	.444	.889	.333	.777	.666			
	07½	.955	.443	.886	.330	.773	.659			
	10	1.954	2.442	4.884	7.326	9.768	44.652			
	11¼	.953	.441	.883	.325	.766	.649			
	12½	.953	.441	.882	.323	.764	.646			
	15	.952	.440	.880	.320	.759	.639			
	17½	.951	.439	.877	.316	.755	.632			
	18¾	.951	.438	.876	.315	.753	.629			
	20	1.950	2.438	4.875	7.313	9.751	14.626			
	22½	.949	.437	.873	.310	.746	.619			
	25	.948	.435	.871	.306	.742	.612			
	26¼	.948	.435	.870	.305	.739	.609			
	27½	.947	.434	.869	.303	.737	.606			
	30	1.947	2.433	4.866	7.299	9.733	14.599			
	32½	.946	.432	.864	.295	.728	.592			
	33¾	.945	.431	.863	.294	.726	.589			
	35	.945	.431	.862	.293	.724	.585			
	37½	.944	.430	.860	.289	.719	.579			
	40	1.943	2.429	4.857	7.286	9.715	14.572			
	41¼	.942	.428	.856	.284	.712	.569			
	42½	.942	.428	.855	.283	.710	.565			
	45	.941	.426	.853	.279	.706	.558			
	47½	.940	.425	.851	.276	.701	.551			
	48¾	.940	.425	.849	.274	.699	.548			
	50	1.939	2.424	4.848	7.272	9.697	14.545			
	52½	.938	.423	.846	.269	.692	.538			
	55	.937	.422	.844	.266	.687	.531			
	56¼	.937	.421	.843	.264	.685	.528			
	57½	.937	.421	.841	.262	.683	.524			
33	00	1.936	2.420	4.839	7.259	9.678	14.518			
	02½	.935	.418	.837	.255	.674	.511			
	03¾	.934	.418	.836	.254	.671	.507			
	05	.934	.417	.835	.252	.669	.504			
	07½	.933	.416	.832	.249	.665	.497			
	10	1.932	2.415	4.830	7.245	9.660	14.490			
	11¼	.932	.415	.829	.243	.658	.487			
	12½	.931	.414	.828	.242	.656	.483			
	15	.930	.413	.825	.238	.651	.476			
	17½	.929	.412	.823	.235	.646	.470			
	18¾	.929	.411	.822	.233	.644	.466			
	20	1.928	2.410	4.821	7.231	9.642	14.463			
	22½	.927	.409	.819	.228	.637	.456			
	25	.926	.408	.816	.224	.633	.449			
	26¼	.926	.408	.815	.223	.630	.445			
	27½	.926	.407	.814	.221	.628	.442			
	30	1.925	2.406	4.812	7.218	9.623	14.435			
	32½	.924	.405	.809	.214	.619	.428			
	33¾	.923	.404	.808	.212	.617	.425			
	35	.923	.404	.807	.211	.614	.421			
	37½	.922	.402	.805	.207	.610	.414			
	40	1.921	2.401	4.802	7.204	9.605	14.407			
	41¼	.921	.401	.801	.202	.603	.404			
	42½	.920	.400	.800	.200	.600	.400			
	45	.919	.399	.798	.197	.596	.394			
	47½	.918	.398	.795	.193	.591	.387			
	48¾	.918	.397	.794	.191	.589	.383			
	50	1.917	2.397	4.793	7.190	9.586	14.380			
	52½	.916	.395	.791	.186	.582	.373			
	55	.915	.394	.789	.183	.577	.366			
	56¼	.915	.394	.787	.181	.575	.362			
	57½	.915	.393	.786	.179	.572	.358			
34	00	1.914	2.392	4.784	7.176	9.568	14.352			
								For latitude 32° 1¼′	2.871	0.000
								2½′	5.742	.001
								3¾′	8.613	.002
								5′	11.483	.004
								6¼′	14.355	.006
								7½′	17.225	.008
								10′	22.967	.015
								12½′	28.709	.024
								15′	34.450	.034
								For latitude 33° 1¼′	2.871	0.000
								2½′	5.743	.001
								3¾′	8.614	.002
								5′	11.485	.004
								6¼′	14.357	.006
								7½′	17.228	.009
								10′	22.971	.015
								12½′	28.714	.024
								15′	34.456	.035
								For latitude 34° 1¼′	2.872	0.000
								2½′	5.744	.001
								3¾′	8.615	.002
								5′	11.487	.004
								6¼′	14.359	.006
								7½′	17.231	.009
								10′	22.974	.016
								12½′	28.718	.024
								15′	34.462	.035

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel					
		Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
34	00	1.914	2.392	4.784	7.176	9.568	14.352
	02½	.913	.391	.782	.172	.563	.345
	03¾	.912	.390	.780	.171	.561	.341
	05	.912	.390	.779	.169	.558	.338
	07½	.911	.388	.777	.165	.554	.331
	10	1.910	2.387	4.775	7.162	9.549	14.324
	11¼	.909	.387	.773	.160	.547	.320
	12½	.909	.386	.772	.158	.544	.316
	15	.908	.385	.770	.155	.540	.309
	17½	.907	.384	.767	.151	.535	.302
	18¾	.906	.383	.766	.149	.533	.299
	20	1.906	2.383	4.765	7.148	9.530	14.295
	22½	.905	.381	.763	.144	.525	.288
	25	.904	.380	.760	.141	.521	.281
	26¼	.904	.380	.759	.139	.518	.278
	27½	.903	.379	.758	.137	.516	.273
	30	1.902	2.378	4.756	7.133	9.511	14.267
	32½	.901	.377	.753	.130	.507	.260
	33¾	.901	.376	.752	.128	.504	.256
	35	.900	.375	.751	.126	.502	.253
	37½	.899	.374	.749	.123	.497	.246
	40	1.898	2.373	4.746	7.119	9.492	14.239
	41¼	.898	.373	.745	.117	.490	.235
	42½	.897	.372	.744	.116	.488	.231
	45	.897	.371	.741	.112	.483	.224
	47½	.896	.370	.739	.109	.478	.217
	48¾	.895	.369	.738	.107	.476	.213
	50	1.895	2.368	4.737	7.105	9.473	14.210
	52½	.894	.367	.734	.101	.468	.203
	55	.893	.366	.732	.098	.464	.196
	56¼	.892	.365	.731	.095	.461	.192
	57½	.892	.365	.729	.094	.459	.188
35	00	1.891	2.364	4.727	7.091	9.454	14.181
	02½	.890	.362	.725	.087	.449	.174
	03¾	.889	.362	.724	.085	.447	.170
	05	.889	.361	.722	.083	.445	.167
	07½	.888	.360	.720	.079	.439	.160
	10	1.887	2.359	4.717	7.076	9.435	14.152
	11¼	.886	.358	.716	.074	.433	.149
	12½	.886	.357	.715	.073	.430	.145
	15	.885	.356	.713	.069	.425	.138
	17½	.884	.355	.710	.065	.420	.131
	18¾	.884	.354	.709	.064	.418	.127
	20	1.883	2.354	4.708	7.062	9.416	14.124
	22½	.882	.353	.705	.058	.411	.116
	25	.881	.352	.703	.054	.406	.109
	26¼	.881	.351	.702	.053	.404	.105
	27½	.880	.350	.701	.051	.401	.102
	30	1.879	2.349	4.698	7.047	9.396	14.094
	32½	.878	.348	.696	.044	.391	.087
	33¾	.878	.347	.694	.042	.389	.083
	35	.877	.347	.693	.040	.387	.080
	37½	.876	.345	.691	.036	.382	.073
	40	1.875	2.344	4.688	7.033	9.377	14.065
	41¼	.875	.344	.687	.031	.374	.062
	42½	.874	.343	.686	.029	.372	.058
	45	.873	.342	.684	.025	.367	.051
	47½	.872	.341	.681	.022	.362	.043
	48¾	.872	.340	.680	.020	.360	.040
	50	1.871	2.339	4.679	7.018	9.357	14.036
	52½	.870	.338	.676	.014	.352	.029
	55	.869	.337	.674	.011	.348	.021
	56¼	.869	.336	.673	.009	.345	.018
	57½	.869	.336	.671	.007	.343	.014
36	00	1.868	2.334	4.669	7.003	9.338	14.007

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 34°	1¼	2.872	0.000
	2½	5.744	.001
	3¾	8.615	.002
	5	11.487	.004
	6¼	14.359	.006
	7½	17.231	.009
	10	22.974	.016
	12½	28.718	.024
	15	34.462	.035
For latitude 35°	1¼	2.872	0.000
	2½	5.745	.001
	3¾	8.617	.002
	5	11.489	.004
	6¼	14.362	.006
	7½	17.234	.009
	10	22.978	.016
	12½	28.723	.025
	15	34.467	.036
For latitude 36°	1¼	2.873	0.000
	2½	5.745	.001
	3¾	8.618	.002
	5	11.491	.004
	6¼	14.364	.006
	7½	17.237	.009
	10	22.982	.016
	12½	28.728	.025
	15	34.473	.036

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
36	00	1.868	2.334	4.669	7.003	9.338	14.007			
	02½	.867	.333	.666	.000	.333	13.999	1¼	2.873	0.000
	03¾	.866	.333	.665	6.998	.330	.996	2½	5.745	.001
	05	.866	.332	.664	.996	.328	.992	3¾	8.618	.002
	07½	.865	.331	.661	.992	.323	.984	5	11.491	.004
								For latitude 36° 6¼	14.364	.006
	10	1.864	2.330	4.659	6.989	9.318	13.977	7½	17.237	.009
	11¼	.863	.329	.658	.987	.316	.973	10	22.982	.016
	12½	.863	.328	.657	.985	.313	.970	12½	28.728	.025
	15	.862	.327	.654	.981	.308	.962	15	34.473	.036
	17½	.861	.326	652	.977	.303	.955			
	18¾	.860	.325	.650	.976	.301	.951			
	20	1.860	2.325	4.649	6.974	9.298	13.947	1¼	2.873	0.000
	22½	.859	.323	.647	.970	.293	.940	2½	5.746	.001
	25	.858	.322	.644	.966	.288	.933	3¾	8.620	.002
	26¼	.857	.321	.643	.964	.286	.929	5	11.493	.004
	27½	.857	.321	.642	.963	.283	.925	For latitude 37° 6¼	14.366	.006
								7½	17.240	.009
	30	1.856	2.320	4.639	6.959	9.278	13.918	10	22.986	.016
	32½	.855	.318	.637	.955	.273	.910	12½	28.733	.025
	33¾	.854	.318	.635	.953	.271	.906	15	34.479	.036
	35	.854	.317	.634	.951	.268	.903			
	37½	.853	.316	.632	.948	.264	.895			
	40	1.852	2.315	4.629	6.944	9.259	13.888	1¼	2.874	0.000
	41¼	.851	.314	.628	.942	.256	.884	2½	5.747	.001
	42½	.851	.313	.627	.940	.254	.880	3¾	8.621	.002
	45	.850	.312	.624	.936	.249	.873	5	11.495	.004
	47½	.849	.311	.622	.933	.243	.865	For latitude 38° 6¼	14.369	.006
	48¾	.848	.310	.621	.931	.241	.862	7½	17.242	.009
								10	22.990	.016
	50	1.848	2.310	4.619	6.929	9.238	13.858	12½	28.738	.025
	52½	.847	.308	.617	.925	.233	.850	15	34.485	.037
	55	.846	.307	.614	.921	.228	.843			
	56¼	.845	.306	.613	.919	.226	.839			
	57½	.845	.306	.612	.918	.223	.835			
37	00	1.844	2.305	4.609	6.914	9.218	13.828			
	02½	.843	.303	.607	.910	.213	.820			
	03¾	.842	.303	.605	.908	.211	.816			
	05	.842	.302	.604	.906	.208	.813			
	07½	.841	.301	.602	.902	.203	.805			
	10	1.840	2.300	4.599	6.899	9.198	13.797			
	11¼	.839	.299	.598	.897	.196	.794			
	12½	.839	.298	.597	.895	.193	.790			
	15	.838	.297	.594	.891	.188	.782			
	17½	.837	.296	.592	.887	.183	.775			
	18¾	.836	.295	.590	.885	.181	.771			
	20	1.836	2.295	4.589	6.884	9.178	13.767			
	22½	.835	.293	.587	.880	.173	.759			
	25	.834	.292	.584	.876	.168	.752			
	26¼	.833	.291	.583	.874	.165	.748			
	27½	.833	.291	.581	.872	.163	.744			
	30	1.832	2.289	4.579	6.868	9.158	13.737			
	32½	.831	.288	.576	.864	.153	.729			
	33¾	.830	.288	.575	.863	.150	.725			
	35	.830	.287	.574	.861	.148	.721			
	37½	.829	.286	.571	.857	.142	.714			
	40	1.827	2.284	4.569	6.853	9.137	13.706			
	41¼	.827	.284	.567	.851	.135	.702			
	42½	.826	.283	.566	.849	.132	.698			
	45	.825	.282	.564	.845	.127	.691			
	47½	.824	.280	.561	.841	.122	.683			
	48¾	.824	.280	.560	.840	.119	.679			
	50	1.823	2.279	4.558	6.838	9.117	13.675			
	52½	.822	.278	.556	.834	.112	.668			
	55	.821	.277	.553	.830	.107	.660			
	56¼	.821	.276	.552	.828	.104	.656			
	57½	.820	.275	.551	.826	.101	.652			
38	00	1.819	2.274	4.548	6.822	9.096	13.644			

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval						Ordinates of developed parallel and meridional distances		
		1′	1¼′	2½′	3¾′	5′	7½′	Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
38	00	1.819	2.274	4.548	6.822	9.096	13.644			
	02½	.818	.273	.546	.818	.091	.636	1¼	2.874	0.000
	03¾	.818	.272	.544	.816	.089	.633	2½	5.747	.001
	05	.817	.272	.543	.814	.086	.629	3¾	8.621	.002
	07½	.816	.270	.540	.811	.081	.621	5	11.495	.004
								For latitude 38° 6¼	14.369	.006
	10	1.815	2.269	4.538	6.807	9.076	13.614	7½	17.242	.009
	11¼	.815	.268	.537	.805	.073	.610	10	22.990	.016
	12½	.814	.268	.535	.803	.071	.606	12½	28.738	.025
	15	.813	.266	.533	.799	.065	.598	15	34.485	.037
	17½	.812	.265	.530	.795	.060	.590			
	18¾	.812	.264	.529	.793	.058	.586			
								1¼	2.874	0.000
	20	1.811	2.264	4.527	6.791	9.055	13.582	2½	5.748	.001
	22½	.810	.262	.525	.787	.050	.575	3¾	8.623	.002
	25	.809	.261	.522	.783	.045	.567	5	11.497	.004
	26¼	.808	.260	.521	.781	.042	.563	For latitude 39° 6¼	14.371	.006
	27½	.808	.260	.520	.780	.039	.559	7½	17.245	.009
								10	22.994	.016
	30	1.807	2.259	4.517	6.776	9.034	13.551	12½	28.743	.026
	32½	.806	.257	.515	.772	.029	.544	15	34.491	.037
	33¾	.805	.257	.513	.770	.026	.540			
	35	.805	.256	.512	.768	.024	.536			
	37½	.804	.255	.509	.764	.019	.528			
								1¼	2.875	0.000
	40	1.803	2.253	4.507	6.760	9.013	13.520	2½	5.749	.001
	41¼	.802	.253	.505	.758	.011	.516	3¾	8.624	.002
	42½	.802	.252	.504	.756	.008	.513	5	11.499	.004
	45	.801	.251	.501	.752	.003	.504	For latitude 40° 6¼	14.374	.006
	47½	.800	.249	.499	.748	8.998	.497	7½	17.248	.009
	48¾	.799	.249	.498	.746	.995	.493	10	22.998	.017
								12½	28.748	.026
	50	1.798	2.248	4.496	6.744	8.992	13.489	15	34.497	.037
	52½	.797	.247	.494	.740	.987	.481			
	55	.796	.245	.491	.736	.982	.473			
	56¼	.796	.245	.490	.734	.979	.469			
	57½	.795	.244	.488	.732	.977	.465			
39	00	1.794	2.243	4.486	6.729	8.971	13.457			
	02½	.793	.242	.483	.725	.966	.449			
	03¾	.793	.241	.482	.723	.964	.445			
	05	.792	.240	.480	.721	.961	.441			
	07½	.791	.239	.478	.717	.956	.433			
	10	1.790	2.238	4.475	6.713	8.950	13.425			
	11¼	.790	.237	.474	.711	.948	.422			
	12½	.789	.236	.473	.709	.945	.418			
	15	.788	.235	.470	.705	.940	.410			
	17½	.787	.234	.467	.701	.934	.402			
	18¾	.786	.233	.466	.699	.932	.398			
	20	1.786	2.232	4.465	6.697	8.929	13.394			
	22½	.785	.231	.462	.693	.924	.386			
	25	.784	.230	.459	.689	.919	.378			
	26¼	.783	.229	.458	.687	.916	.374			
	27½	.783	.228	.457	.685	.913	.370			
	30	1.782	2.227	4.454	6.681	8.908	13.362			
	32½	.781	.226	.451	.677	.903	.354			
	33¾	.780	.225	.450	.675	.900	.350			
	35	.779	.224	.449	.673	.897	.346			
	37½	.778	.223	.446	.669	.892	.338			
	40	1.777	2.222	4.443	6.665	8.887	13.330			
	41¼	.777	.221	.442	.663	.884	.326			
	42½	.776	.220	.441	.661	.881	.322			
	45	.775	.219	.438	.657	.876	.314			
	47½	.774	.218	.435	.653	.871	.306			
	48¾	.774	.217	.434	.651	.868	.302			
	50	1.773	2.216	4.433	6.649	8.865	13.298			
	52½	.772	.215	.430	.645	.860	.290			
	55	.771	.214	.427	.641	.855	.282			
	56¼	.770	.213	.426	.639	.852	.278			
	57½	.770	.212	.425	.637	.849	.274			
40	00	1.769	2.211	4.422	6.633	8.844	13.266			

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
40	00	1.769	2.211	4.422	6.633	8.844	13.266			
	02½	.768	.210	.419	.629	.838	.258	1¼	2.875	0.000
	03¾	.767	.209	.418	.627	.836	.254	2½	5.749	.001
	05	.767	.208	.416	.625	.833	.250	3¾	8.624	.002
	07½	.765	.207	.414	.621	.828	.241	5	11.499	.004
								For latitude 40° 6¼	14.374	.006
								7½	17.248	.009
	10	1.764	2.206	4.411	6.617	8.822	13.233	10	22.998	.017
	11¼	.764	.205	.410	.615	.819	.229	12½	28.748	.026
	12½	.763	.204	.408	.612	.817	.224	15	34.497	.037
	15	.762	.203	.406	.609	.811	.217			
	17½	.761	.202	.403	.605	.806	.209			
	18¾	.761	.201	.402	.602	.803	.205			
								1¼	2.875	0.000
	20	1.760	2.200	4.400	6.600	8.801	13.201	2½	5.750	.001
	22½	.759	.199	.398	.596	.795	.193	3¾	8.626	.002
	25	.758	.197	.395	.592	.790	.185	5	11.501	.004
	26¼	.757	.197	.394	.590	.787	.181	For latitude 41° 6¼	14.376	.006
	27½	.757	.196	.392	.588	.784	.177	7½	17.252	.009
								10	23.002	.017
								12½	28.753	.026
								15	34.503	.037
	30	1.756	2.195	4.389	6.584	8.779	13.168			
	32½	.755	.193	.387	.580	.773	.160			
	33¾	.754	.193	.385	.578	.771	.156			
	35	.754	.192	.384	.576	.768	.152			
	37½	.753	.191	.381	.572	.763	.144			
								1¼	2.876	0.000
	40	1.751	2.189	4.379	6.568	8.757	13.136	2½	5.751	.001
	41¼	.751	.189	.377	.566	.754	.132	3¾	8.627	.002
	42½	.750	.188	.376	.564	.752	.128	5	11.503	.004
	45	.749	.186	.373	.560	.746	.119	For latitude 42° 6¼	14.379	.007
	47½	.748	.185	.370	.556	.741	.111	7½	17.255	.009
	48¾	.748	.184	.369	.554	.738	.107	10	23.006	.017
								12½	28.758	.026
								15	34.509	.038
	50	1.747	2.184	4.368	6.551	8.735	13.103			
	52½	.746	.182	.365	.547	.730	.095			
	55	.745	.181	.362	.543	.724	.087			
	56¼	.744	.180	.361	.541	.722	.083			
	57½	.744	.180	.360	.539	.719	.078			
41	00	1.743	2.178	4.357	6.535	8.713	13.070			
	02½	.742	.177	.354	.531	.708	.062			
	03¾	.741	.176	.353	.529	.705	.058			
	05	.740	.176	.351	.527	.702	.054			
	07½	.739	.174	.348	.523	.697	.045			
	10	1.738	2.173	4.346	6.519	8.691	13.037			
	11¼	.738	.172	.344	.517	.689	.033			
	12½	.737	.171	.343	.514	.686	.029			
	15	.736	.170	.340	.510	.680	.021			
	17½	.735	.169	.337	.506	.675	.012			
	18¾	.734	.168	.336	.504	.672	.008			
	20	1.734	2.167	4.335	6.502	8.669	13.004			
	22½	.733	.166	.332	.498	.664	12.996			
	25	.732	.165	.329	.494	.658	.987			
	26¼	.731	.164	.328	.492	.656	.983			
	27½	.731	.163	.326	.490	.653	.979			
	30	1.729	2.162	4.324	6.485	8.647	12.971			
	32½	.728	.160	.321	.481	.642	.963			
	33¾	.728	.160	.319	.479	.639	.958			
	35	.727	.159	.318	.477	.636	.954			
	37½	.726	.158	.315	.473	.631	.946			
	40	1.725	2.156	4.313	6.469	8.625	12.938			
	41¼	.724	.156	.311	.467	.622	.933			
	42½	.724	.155	.310	.465	.619	.929			
	45	.723	.153	.307	.460	.614	.921			
	47½	.722	.152	.304	.456	.608	.913			
	48¾	.721	.151	.303	.454	.606	.908			
	50	1.721	2.151	4.301	6.452	8.603	12.904			
	52½	.719	.149	.297	.448	.597	.896			
	55	.718	.148	.296	.444	.592	.887			
	56¼	.718	.147	.294	.442	.589	.883			
	57½	.717	.146	.293	.439	.586	.879			
42	00	1.716	2.145	4.290	6.435	8.580	12.871			

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
42	00	1.716	2.145	4.290	6.435	8.580	12.871
	02½	.715	.144	.287	.431	.575	.862
	03¾	.714	.143	.286	.429	.572	.858
	05	.714	.142	.285	.427	.569	.854
	07½	.713	.141	.282	.423	.564	.845
	10	1.712	2.140	4.279	6.418	8.558	12.837
	11¼	.711	.139	.278	.416	.555	.833
	12½	.711	.138	.276	.414	.552	.829
	15	.709	.137	.273	.410	.547	.820
	17½	.708	.135	.271	.406	.541	.812
	18¾	.708	.135	.269	.404	.538	.807
	20	1.707	2.134	4.268	6.402	8.535	12.803
	22½	.706	.132	.265	.397	.530	.795
	25	.705	.131	.262	.393	.524	.786
	26¼	.704	.130	.261	.391	.521	.782
	27½	.704	.130	.259	.388	.519	.778
	30	1.703	2.128	4.256	6.385	8.513	12.769
	32½	.701	.127	.254	.380	.507	.761
	33¾	.701	.126	.252	.378	.504	.757
	35	.700	.125	.251	.376	.502	.752
	37½	.699	.124	.248	.372	.496	.744
	40	1.698	2.123	4.245	6.368	8.490	12.735
	41¼	.697	.122	.244	.366	.487	.731
	42½	.697	.121	.242	.363	.485	.727
	45	.696	.120	.239	.359	.479	.718
	47½	.695	.118	.237	.355	.473	.710
	48¾	.694	.118	.235	.353	.470	.706
	50	1.693	2.117	4.234	6.351	8.468	12.701
	52½	.692	.115	.231	.346	.462	.693
	55	.691	.114	.228	.342	.456	.684
	56¼	.691	.113	.227	.340	.453	.680
	57½	.690	.113	.225	.338	.450	.676
43	00	1.689	2.111	4.222	6.334	8.445	12.667
	02½	.688	.110	.220	.329	.439	.659
	03¾	.687	.109	.218	.327	.436	.654
	05	.687	.108	.217	.325	.433	.650
	07½	.686	.107	.214	.321	.428	.641
	10	1.684	2.105	4.211	6.316	8.422	12.633
	11¼	.684	.105	.210	.314	.419	.629
	12½	.683	.104	.208	.312	.416	.624
	15	.682	.103	.205	.308	.410	.616
	17½	.681	.101	.202	.303	.405	.607
	18¾	.680	.100	.201	.301	.402	.603
	20	1.680	2.100	4.199	6.299	8.399	12.598
	22½	.679	.098	.197	.295	.393	.590
	25	.677	.097	.194	.291	.387	.581
	26¼	.677	.096	.192	.289	.385	.577
	27½	.676	.095	.191	.286	.382	.573
	30	1.675	2.094	4.188	6.282	8.376	12.564
	32½	.674	.093	.185	.278	.370	.555
	33¾	.673	.092	.184	.275	.367	.551
	35	.673	.091	.182	.273	.364	.547
	37½	.672	.090	.179	.269	.359	.538
	40	1.671	2.088	4.176	6.265	8.353	12.529
	41¼	.670	.087	.175	.262	.350	.525
	42½	.669	.087	.173	.260	.347	.521
	45	.668	.085	.171	.256	.341	.512
	47½	.667	.084	.168	.252	.336	.503
	48¾	.666	.083	.166	.249	.333	.499
	50	1.666	2.082	4.165	6.247	8.330	12.495
	52½	.665	.081	.162	.243	.324	.486
	55	.664	.080	.159	.239	.318	.477
	56¼	.663	.079	.158	.236	.315	.473
	57½	.662	.078	.156	.234	.312	.468
44	00	1.661	2.077	4.153	6.230	8.307	12.460

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 42°	1¼	2.876	0.000
	2½	5.751	.001
	3¾	8.627	.002
	5	11.503	.004
	6¼	14.379	.007
	7½	17.255	.009
	10	23.006	.017
	12½	28.758	.026
	15	34.509	.038
For latitude 43°	1¼	2.876	0.000
	2½	5.752	.001
	3¾	8.629	.002
	5	11.505	.004
	6¼	14.382	.007
	7½	17.258	.009
	10	23.010	.017
	12½	28.763	.026
	15	34.515	.038
For latitude 44°	1¼	2.877	0.000
	2½	5.753	.001
	3¾	8.630	.002
	5	11.507	.004
	6¼	14.384	.007
	7½	17.261	.009
	10	23.014	.017
	12½	28.768	.026
	15	34.521	.038

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances			
		Longitude interval						Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′				
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*		′	*Inches*	*Inch*
44	00	1.661	2.077	4.153	6.230	8.307	12.460	For latitude 44°	1¼	2.877	0.000
	02½	.660	.075	.150	.226	.301	.451		2½	5.753	.001
	03¾	.660	.074	.149	.223	.298	.447		3¾	8.630	.002
	05	.659	.074	.147	.221	.295	.442		5	11.507	.004
	07½	.658	.072	.145	.217	.289	.434		6¼	14.384	.007
									7½	17.261	.009
	10	1.657	2.071	4.142	6.212	8.283	12.425		10	23.014	.017
	11¼	.656	.070	.140	.210	.280	.420		12½	28.768	.026
	12½	.656	.069	.139	.208	.277	.416		15	34.521	.038
	15	.654	.068	.136	.204	.272	.407				
	17½	.653	.066	.133	.199	.266	.399				
	18¾	.653	.066	.131	.197	.263	.394				
	20	1.652	2.065	4.130	6.195	8.260	12.390				
	22½	.651	.064	.127	.191	.254	.381				
	25	.650	.062	.124	.186	.248	.372				
	26¼	.649	.061	.123	.184	.245	.369	For latitude 45°	1¼	2.877	0.000
	27½	.648	.061	.121	.182	.242	.364		2½	5.755	.001
									3¾	8.632	.002
	30	1.647	2.059	4.118	6.177	8.236	12.355		5	11.509	.004
	32½	.646	.058	.115	.173	.231	.346		6¼	14.387	.007
	33¾	.645	.057	.114	.171	.228	.341		7½	17.264	.009
	35	.645	.056	.112	.169	.225	.337		10	23.018	.017
	37½	.644	.055	.109	.164	.219	.328		12½	28.773	.026
									15	34.527	.038
	40	1.643	2.053	4.106	6.160	8.213	12.319				
	41¼	.642	.052	.105	.158	.210	.315				
	42½	.641	.052	.104	.155	.207	.311				
	45	.640	.050	.101	.151	.201	.302				
	47½	.639	.049	.098	.146	.195	.293				
	48¾	.639	.048	.096	.144	.192	.289				
	50	1.638	2.047	4.095	6.142	8.189	12.284				
	52½	.637	.046	.092	.138	.184	.275				
	55	.636	.044	.089	.133	.178	.266				
	56¼	.635	.044	.087	.131	.175	.262				
	57½	.634	.043	.086	.129	.172	.258				
45	00	1.633	2.041	4.083	6.124	8.166	12.249				
	02½	.632	.040	.080	.120	.160	.240				
	03¾	.631	.039	.078	.118	.157	.235				
	05	.631	.038	.077	.115	.154	.231				
	07½	.630	.037	.074	.111	.148	.222				
	10	1.629	2.036	4.071	6.107	8.142	12.213				
	11¼	.628	.035	.070	.105	.139	.209				
	12½	.627	.034	.068	.102	.136	.204				
	15	.626	.033	.065	.098	.130	.195				
	17½	.625	.031	.062	.093	.124	.186				
	18¾	.624	.030	.061	.091	.121	.182				
	20	1.624	2.030	4.059	6.089	8.118	12.177				
	22½	.622	.028	.056	.084	.112	.168				
	25	.621	.027	.053	.080	.106	.160				
	26¼	.621	.026	.052	.078	.103	.155				
	27½	.620	.025	.050	.075	.100	.151				
	30	1.619	2.024	4.047	6.071	8.094	12.142				
	32½	.618	.022	.044	.066	.088	.133				
	33¾	.617	.021	.043	.064	.085	.128				
	35	.616	.021	.041	.062	.082	.124				
	37½	.615	.019	.038	.057	.076	.115				
	40	1.614	2.018	4.035	6.053	8.070	12.106				
	41¼	.613	.017	.034	.051	.067	.101				
	42½	.613	.016	.032	.048	.065	.097				
	45	.612	.015	.029	044	.059	.088				
	47½	.611	.013	.026	.039	.053	.079				
	48¾	.610	.012	.025	.037	.050	.074				
	50	1.609	2.012	4.023	6.035	8.047	12.070				
	52½	.608	.010	.020	.030	.040	.061				
	55	.607	.009	.017	.026	.034	.052				
	56¼	.606	.008	.016	.024	.031	.047				
	57½	.606	.007	.014	.021	.028	.043				
46	00	1.605	2.006	4.011	6.017	8.022	12.034				

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval 1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
46	00	1.605	2.006	4.011	6.017	8.022	12.034
	02½	.603	.004	.008	.012	.016	.025
	03¾	.603	.003	.007	.010	.013	.020
	05	.602	.003	.005	.008	.010	.016
	07½	.601	.001	.002	.003	.004	.007
	10	1.600	2.000	3.999	5.999	7.998	11.998
	11¼	.599	1.999	.998	.996	.995	.993
	12½	.598	.998	.996	.994	.992	.988
	15	.597	.997	.993	.990	.986	.979
	17½	.596	.995	.990	.985	.980	.970
	18¾	.595	.994	.989	.983	.977	.966
	20	1.595	1.994	3.987	5.981	7.974	11.961
	22½	.594	.992	.984	.976	.968	.952
	25	.592	.990	.981	.972	.962	.943
	26¼	.592	.990	.979	.969	.959	.938
	27½	.591	.989	.978	.967	.956	.934
	30	1.590	1.987	3.975	5.962	7.950	11.925
	32½	.589	.986	.972	.958	.944	.916
	33¾	.588	.985	.970	.956	.941	.911
	35	.588	.984	.969	.953	.938	.907
	37½	.586	.983	.966	.949	.932	.897
	40	1.585	1.981	3.963	5.944	7.926	11.888
	41¼	.584	.981	.961	.942	.923	.884
	42½	.584	.980	.960	.940	.919	.879
	45	.583	.978	.957	.935	.913	.870
	47½	.581	.977	.954	.930	.907	.861
	48¾	.581	.976	.952	.928	.904	.856
	50	1.580	1.975	3.951	5.926	7.901	11.852
	52½	.579	.974	.948	.921	.895	.843
	55	.578	.972	.944	.917	.889	.853
	56¼	.577	.971	.943	.914	.886	.829
	57½	.577	.971	.941	.912	.883	.824
47	00	1.575	1.969	3.938	5.908	7.877	11.815
	02½	.574	.968	.935	.903	.871	.806
	03¾	.574	.967	.934	.901	.868	.801
	05	.573	.966	.932	.898	.864	.797
	07½	.572	.965	.929	.894	.858	.788
	10	1.570	1.963	3.926	5.889	7.852	11.778
	11¼	.570	.962	.925	.887	.849	.774
	12½	.569	.962	.923	.885	.846	.769
	15	.568	.960	.920	.880	.840	.760
	17½	.567	.958	.917	.875	.834	.751
	18¾	.566	.958	.915	.873	.831	.746
	20	1.565	1.957	3.914	5.871	7.828	11.741
	22½	.564	.955	.911	.866	.821	.732
	25	.563	.954	.908	.861	.815	.723
	26¼	.562	.953	.906	.859	.812	.718
	27½	.562	.952	.905	.857	.809	.714
	30	1.561	1.951	3.901	5.852	7.803	11.704
	32½	.559	.949	.898	.848	.797	.695
	33¾	.559	.948	.897	.845	.794	.691
	35	.558	.948	.895	.843	.791	.686
	37½	.557	.946	.892	.838	.784	.677
	40	1.556	1.945	3.889	5.834	7.778	11.667
	41¼	.555	.944	.888	.831	.775	.663
	42½	.554	.943	.886	.829	.772	.658
	45	.553	.941	.883	.824	.766	.649
	47½	.552	.940	.880	.820	.760	.639
	48¾	.551	.939	.878	.817	.757	.635
	50	1.551	1.938	3.877	5.815	7.753	11.630
	52½	.549	.937	.874	.810	.747	.621
	55	.548	.935	.871	.806	.741	.612
	56¼	.548	.934	.869	.803	.738	.607
	57½	.547	.934	.867	.801	.735	.602
48	00	1.546	1.932	3.864	5.796	7.729	11.593

Ordinates of developed parallel and meridional distances — Latitude and longitude intervals	′	Meridional distance	Ordinate of developed parallel
		Inches	*Inch*
For latitude 46°	1¼	2.878	0.000
	2½	5.756	.001
	3¾	8.633	.002
	5	11.511	.004
	6¼	14.389	.007
	7½	17.267	.009
	10	23.022	.017
	12½	28.778	.026
	15	34.534	.038
For latitude 47°	1¼	2.878	0.000
	2½	5.757	.001
	3¾	8.635	.002
	5	11.513	.004
	6¼	14.392	.007
	7½	17.270	.009
	10	23.026	.017
	12½	28.784	.026
	15	34.540	.038
For latitude 48°	1¼	2.879	0.000
	2½	5.758	.001
	3¾	8.636	.002
	5	11.515	.004
	6¼	14.394	.007
	7½	17.273	.009
	10	23.030	.017
	12½	28.789	.026
	15	34.546	.038

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
48	00	1.546	1.932	3.864	5.796	7.729	11.593			
	02½	.544	.931	.861	.792	.722	.583			
	03¾	.544	.930	.860	.789	.719	.579			
	05	.543	.929	.858	.787	.716	.574			
	07½	.542	.927	.855	.782	.710	.565			
	10	1.541	1.926	3.852	5.778	7.704	11.555			
	11¼	.540	.925	.850	.775	.701	.551			
	12½	.540	.924	.849	.773	.697	.546			
	15	.538	.923	.846	.768	.691	.537			
	17½	.537	.921	.842	.764	.685	.527			
	18¾	.536	.920	.841	.761	.682	.523			
	20	1.536	1.920	3.839	5.759	7.679	11.518			
	22½	.534	.918	.836	.754	.672	.509			
	25	.533	.917	.833	.750	.666	.499			
	26¼	.533	.916	.831	.747	.663	.494			
	27½	.532	.915	.830	.745	.660	.490			
	30	1.531	1.913	3.827	5.740	7.654	11.480			
	32½	.529	.912	.824	.735	.647	.471			
	33¾	.529	.911	.822	.733	.644	.466			
	35	.528	.910	.820	.731	.641	.462			
	37½	.527	.909	.817	.726	.635	.452			
	40	1.526	1.907	3.814	5.721	7.628	11.443			
	41¼	.525	.906	.813	.719	.625	.438			
	42½	.524	.905	.811	.717	.622	.433			
	45	.523	.904	.808	.712	.616	.424			
	47½	.522	.902	.805	.707	.610	.414			
	48¾	.521	.902	.803	.705	.606	.410			
	50	1.521	1.901	3.802	5.702	7.603	11.405			
	52½	.519	.899	.798	.698	.597	.395			
	55	.518	.898	.795	.693	.591	.386			
	56¼	.518	.897	.794	.691	.587	.381			
	57½	.517	.896	.792	.688	.584	.376			
49	00	1.516	1.894	3.789	5.684	7.578	11.367			
	02½	.514	.893	.786	.679	.572	.358			
	03¾	.514	.892	.784	.676	.569	.353			
	05	.513	.891	.783	.674	.565	.348			
	07½	.512	.890	.780	.669	.559	.339			
	10	1.511	1.888	3.776	5.665	7.553	11.329			
	11¼	.510	.887	.775	.662	.550	.324			
	12½	.509	.887	.773	.660	.546	.320			
	15	.508	.885	.770	.655	.540	.310			
	17½	.507	.883	.767	.650	.534	.301			
	18¾	.506	.883	.765	.648	.531	.296			
	20	1.505	1.882	3.764	5.646	7.527	11.291			
	22½	.504	.880	.760	.641	.521	.281			
	25	.503	.879	.757	.636	.515	.272			
	26¼	.502	.878	.756	.634	.511	.267			
	27½	.502	.877	.754	.631	.508	.262			
	30	1.500	1.875	3.751	5.626	7.502	11.253			
	32½	.499	.874	.748	.622	.496	.243			
	33¾	.498	.873	.746	.619	.492	.238			
	35	.498	.872	.745	.617	.489	.234			
	37½	.497	.871	.741	.612	.483	.224			
	40	1.495	1.869	3.738	5.607	7.476	11.215			
	41¼	.495	.868	.737	.605	.473	.210			
	42½	.494	.867	.735	.602	.470	.205			
	45	.493	.866	.732	.598	.464	.195			
	47½	.492	.864	.729	.593	.457	.186			
	48¾	.491	.863	.727	.591	.454	.181			
	50	1.490	1.863	3.725	5.588	7.451	11.176			
	52½	.489	.861	.722	.583	.444	.167			
	55	.488	.860	.719	.578	.438	.157			
	56¼	.487	.859	.717	.576	.435	.152			
	57½	.486	.858	.716	.574	.432	.147			
50	00	1.485	1.856	3.713	5.569	7.425	11.138			
								For latitude 48°		
								1¼	2.879	0.000
								2½	5.758	.001
								3¾	8.636	.002
								5	11.515	.004
								6¼	14.394	.007
								7½	17.273	.009
								10	23.030	.017
								12½	28.789	.026
								15	34.546	.038
								For latitude 49°		
								1¼	2.879	0.000
								2½	5.759	.001
								3¾	8.638	.002
								5	11.517	.004
								6¼	14.397	.007
								7½	17.276	.009
								10	23.034	.017
								12½	28.794	.026
								15	34.552	.037
								For latitude 50°		
								1¼	2.880	0.000
								2½	5.760	.001
								3¾	8.639	.002
								5	11.519	.004
								6¼	14.399	.006
								7½	17.279	.009
								10	23.039	.017
								12½	28.799	.026
								15	34.558	.037

TABLE 3.—*Coordinates for the projection of maps, scale* $\frac{1}{31680}$—Continued

Latitude of parallel		Abscissas of developed parallel					
		Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
50	00	1.485	1.856	3.713	5.569	7.425	11.138
	02½	.484	.855	.709	.564	.419	.128
	03¾	.483	.854	.708	.562	.416	.123
	05	.482	.853	.706	.559	.412	.118
	07½	.481	.851	.703	.554	.406	.109
	10	1.480	1.850	3.700	5.550	7.399	11.099
	11¼	.479	.849	.698	.547	.396	.094
	12½	.479	.848	.697	.545	.393	.090
	15	.477	.847	.693	.540	.387	.080
	17½	.476	.845	.690	.535	.380	.070
	18¾	.475	.844	.688	.533	.377	.065
	20	1.475	1.843	3.687	5.530	7.374	11.061
	22½	.473	.842	.684	.525	.367	.051
	25	.472	.840	.680	.521	.361	.041
	26¼	.471	.839	.679	.518	.358	.036
	27½	.471	.839	.677	.516	.354	.031
	30	1.470	1.837	3.674	5.511	7.348	11.022
	32½	.468	.835	.671	.506	.341	.012
	33¾	.468	.835	.669	.504	.338	.007
	35	.467	.834	.667	.501	.335	.002
	37½	.466	.832	.664	.496	.328	10.993
	40	1.464	1.830	3.661	5.491	7.322	10.983
	41¼	.464	.830	.659	.489	.319	.978
	42½	.463	.829	.658	.487	.316	.973
	45	.462	.827	.655	.482	.309	.964
	47½	.461	.826	.651	.477	.303	.954
	48¾	.460	.825	.650	.474	.299	.949
	50	1.459	1.824	3.648	5.472	7.296	10.944
	52½	.458	.822	.645	.467	.290	.934
	55	.457	.821	.642	.462	.283	.925
	56¼	.456	.820	.640	.460	.280	.920
	57½	.455	.819	.638	.457	.277	.915
51	00	1.454	1.818	3.635	5.453	7.270	10.905
	02½	.453	.816	.632	.448	.264	.895
	03¾	.452	.815	.630	.445	.260	.890
	05	.451	.814	.628	.443	.257	.886
	07½	.450	.813	.625	.438	.250	.876
	10	1.449	1.811	3.622	5.433	7.244	10.866
	11¼	.448	.810	.620	.431	.241	.861
	12½	.447	.809	.619	.428	.237	.856
	15	.446	.808	.615	.423	.231	.846
	17½	.445	.806	.612	.418	.224	.837
	18¾	.444	.805	.611	.416	.221	.832
	20	1.444	1.804	3.609	5.413	7.218	10.827
	22½	.442	.803	.606	.408	.211	.817
	25	.441	.801	.602	.404	.205	.807
	26¼	.440	.800	.601	.401	.201	.802
	27½	.440	.800	.599	.399	.198	.797
	30	1.438	1.798	3.596	5.394	7.192	10.787
	32½	.437	.796	.593	.389	.185	.778
	33¾	.436	.795	.591	.386	.182	.773
	35	.436	.795	.589	.384	.178	.768
	37½	.434	.793	.586	.379	.172	.758
	40	1.433	1.791	3.583	5.374	7.165	10.748
	41¼	.432	.791	.581	.372	.162	.743
	42½	.432	.790	.579	.369	.159	.738
	45	.430	.788	.576	.364	.152	.728
	47½	.429	.786	.573	.359	.146	.718
	48¾	.428	.786	.571	.357	.142	.713
	50	1.428	1.785	3.570	5.354	7.139	10.709
	52½	.426	.783	.566	.349	.132	.699
	55	.425	.781	.563	.344	.126	.689
	56¼	.425	.781	.561	.342	.123	.684
	57½	.424	.780	.560	.339	.119	.679
52	00	1.423	1.778	3.556	5.334	7.113	10.669

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 50°	1¼	2.880	0.000
	2½	5.760	.001
	3¾	8.639	.002
	5	11.519	.004
	6¼	14.399	.006
	7½	17.279	.009
	10	23.039	.017
	12½	28.799	.026
	15	34.558	.037
For latitude 51°	1¼	2.880	0.000
	2½	5.761	.001
	3¾	8.641	.002
	5	11.521	.004
	6¼	14.402	.006
	7½	17.282	.009
	10	23.043	.016
	12½	28.804	.026
	15	34.564	.037
For latitude 52°	1¼	2.881	0.000
	2½	5.762	.001
	3¾	8.643	.002
	5	11.523	.004
	6¼	14.404	.006
	7½	17.285	.009
	10	23.046	.016
	12½	28.809	.025
	15	34.570	.037

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
0	00	3.043	3.804	7.609	11.413	15.217	22.826	1¼	3.779	0.000
	02½	.043	.804	.609	.413	.217	.826	2½	7.557	.000
	03¾	.043	.804	.609	.413	.217	.826	3¾	11.336	.000
	05	.043	.804	.609	.413	.217	.826	5	15.114	.000
	07½	.043	.804	.609	.413	.217	.826	For latitude 0° 6¼	18.893	.000
								7½	22.672	.000
	10	3.043	3.804	7.609	11.413	15.217	22.826	10	30.229	.000
	11¼	.043	.804	.609	.413	.217	.826	12½	37.786	.000
	12½	.043	.804	.609	.413	.217	.826	15	45.344	.000
	15	.043	.804	.609	.413	.217	.826			
	17½	.043	.804	.609	.413	.217	.826			
	18¾	.043	.804	.609	.413	.217	.826	1¼	3.779	0.000
								2½	7.557	.000
	20	3.043	3.804	7.609	11.413	15.217	22.826	3¾	11.336	.000
	22½	.043	.804	.609	.413	.217	.826	5	15.115	.000
	25	.043	.804	.609	.413	.217	.826	For latitude 1° 6¼	18.893	.000
	26¼	.043	.804	.609	.413	.217	.826	7½	22.672	.000
	27½	.043	.804	.609	.413	.217	.826	10	30.229	.001
								12½	37.787	.001
	30	3.043	3.804	7.609	11.413	15.217	22.826	15	45.344	.002
	32½	.043	.804	.608	.413	.217	.825			
	33¾	.043	.804	.608	.413	.217	.825			
	35	.043	.804	.608	.413	.217	.825			
	37½	.043	.804	.608	.413	.217	.825			
								1¼	3.779	0.000
	40	3.043	3.804	7.608	11.412	15.217	22.825	2½	7.557	.000
	41¼	.043	.804	.608	.412	.216	.825	3¾	11.336	.000
	42½	.043	.804	.608	.412	.216	.825	5	15.115	.000
	45	.043	.804	.608	.412	.216	.824	For latitude 2° 6¼	18.893	.001
	47½	.043	.804	.608	.412	.216	.824	7½	22.672	.001
	48¾	.043	.804	.608	.412	.216	.824	10	30.229	.001
								12½	37.787	.002
	50	3.043	3.804	7.608	11.412	15.216	22.824	15	45.344	.003
	52½	.043	.804	.608	.412	.216	.824			
	55	.043	.804	.608	.412	.216	.823			
	56¼	.043	.804	.608	.412	.215	.823			
	57½	.043	.804	.608	.412	.215	.823			
1	00	3.043	3.804	7.608	11.411	15.215	22.823			
	02½	.043	.804	.608	.411	.215	.823			
	03¾	.043	.804	.607	.411	.215	.822			
	05	.043	.804	.607	.411	.215	.822			
	07½	.043	.804	.607	.411	.215	.822			
	10	3.043	3.804	7.607	11.411	15.214	22.822			
	11¼	.043	.804	.607	.411	.214	.821			
	12½	.043	.804	.607	.411	.214	.821			
	15	.043	.803	.607	.410	.214	.821			
	17½	.043	.803	.607	.410	.214	.820			
	18¾	.043	.803	.607	.410	.214	.820			
	20	3.043	3.803	7.607	11.410	15.213	22.820			
	22½	.043	.803	.607	.410	.213	.820			
	25	.043	.803	.606	.410	.213	.819			
	26¼	.043	.803	.606	.410	.213	.819			
	27½	.043	.803	.606	.409	.213	.819			
	30	3.042	3.803	7.606	11.409	15.212	22.819			
	32½	.042	.803	.606	.409	.212	.818			
	33¾	.042	.803	.606	.409	212	.818			
	35	.042	.803	.606	.409	.212	.818			
	37½	.042	.803	.606	.409	.211	.817			
	40	3.042	3.803	7.606	11.408	15.211	22.817			
	41¼	.042	.803	.605	.408	.211	.816			
	42½	.042	.803	.605	.408	.211	.816			
	45	.042	.803	.605	.408	.210	.816			
	47½	.042	.803	.605	.408	.210	.815			
	48¾	.042	.802	.605	.407	.210	.815			
	50	3.042	3.802	7.605	11.407	15.210	22.815			
	52½	.042	.802	.605	.407	.209	.814			
	55	.042	.802	.605	.407	.209	.814			
	56¼	.042	.802	.604	.407	.209	813			
	57½	.042	.802	.604	.407	.209	.813			
2	00	3.042	3.802	7.604	11.406	15.208	22.812			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel	Abscissas of developed parallel					
	Longitude interval					
	1′	1¼′	2½′	3¾′	5′	7½′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
2 00	3.042	3.802	7.604	11.406	15.208	22.812
02½	.042	.802	.604	.406	.208	.812
03¾	.042	.802	.604	.406	.208	.812
05	.041	.802	.604	.406	.207	.811
07½	.041	.802	.604	.405	.207	.811
10	3.041	3.802	7.603	11.405	15.207	22.810
11¼	.041	.802	.603	.405	.206	.810
12½	.041	.802	.603	.405	.206	.809
15	.041	.801	.603	.404	.206	.809
17½	.041	.801	.603	.404	.205	.808
18¾	.041	.801	.603	.404	.205	.808
20	3.041	3.801	7.602	11.404	15.205	22.808
22½	.041	.801	.602	.403	.205	.807
25	.041	.801	.602	.403	.204	.806
26¼	.041	.801	.602	.403	.204	.806
27½	.041	.801	.602	.403	.204	.805
30	3.041	3.801	7.602	11.402	15.203	22.805
32½	.041	.801	.601	.402	.203	.804
33¾	.041	.801	.601	.402	.202	.804
35	.040	.801	.601	.402	.202	.803
37½	.040	.800	.601	.401	.202	.802
40	3.040	3.800	7.601	11.401	15.201	22.802
41¼	.040	.800	.600	.401	.201	.801
42½	.040	.800	.600	.400	.201	.801
45	.040	.800	.600	.400	.200	.800
47½	.040	.800	.600	.400	.200	.799
48¾	.040	.800	.600	.400	.199	.799
50	3.040	3.800	7.600	11.399	15.199	22.799
52½	.040	.800	.599	.399	.198	.798
55	.039	.799	.599	.398	.198	.797
56¼	.039	.799	.599	.398	.198	.796
57½	.039	.799	.599	.398	.197	.796
3 00	3.039	3.799	7.598	11.398	15.197	22.795
02½	.039	.799	.598	.397	.196	.794
03¾	.039	.799	.598	.397	.196	.794
05	.039	.799	.598	.397	.196	.794
07½	.039	.799	.598	.396	.195	.793
10	3.039	3.799	7.597	11.396	15.195	22.792
11¼	.039	.799	.597	.396	.194	.791
12½	.039	.798	.597	.395	.194	.791
15	.039	.798	.597	.395	.193	.790
17½	.039	.798	.596	.394	.193	.789
18¾	.038	.798	.596	.394	.192	.788
20	3.038	3.798	7.596	11.394	15.192	22.788
22½	.038	.798	.596	.393	.191	.787
25	.038	.798	.595	.393	.191	.786
26¼	.038	.798	.595	.393	.190	.786
27½	.038	.798	.595	.393	.190	.785
30	3.038	3.797	7.595	11.392	15.189	22.784
32½	.038	.797	.594	.391	.189	.783
33¾	.038	.797	.594	.391	.188	.782
35	.038	.797	.594	.391	.188	.782
37½	.037	.797	.594	.390	.187	.781
40	3.037	3.797	7.593	11.390	15.187	22.780
41¼	.037	.797	.593	.390	.186	.779
42½	.037	.796	.593	.389	.186	.779
45	.037	.796	.593	.389	.185	.778
47½	.037	.796	.592	.388	.184	.777
48¾	.037	.796	.592	.388	.184	.776
50	3.037	3.796	7.592	11.388	15.184	22.776
52½	.037	.796	.591	.387	.183	.774
55	.036	.796	.591	.387	.182	.773
56¼	.036	.795	.591	.386	.182	.773
57½	.036	.795	.591	.386	.181	.772
4 00	3.036	3.795	7.590	11.386	15.181	22.771

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 2°	1¼	3.779	0.000
	2½	7.557	.000
	3¾	11.336	.000
	5	15.115	.000
	6¼	18.893	.001
	7½	22.672	.001
	10	30.229	.001
	12½	37.787	.002
	15	45.344	.003
For latitude 3°	1¼	3.779	0.000
	2½	7.557	.000
	3¾	11.336	.000
	5	15.115	.001
	6¼	18.894	.001
	7½	22.673	.001
	10	30.230	.002
	12½	37.788	.004
	15	45.345	.005
For latitude 4°	1¼	3.779	0.000
	2½	7.558	.000
	3¾	11.337	.000
	5	15.115	.001
	6¼	18.894	.001
	7½	22.673	.002
	10	30.231	.003
	12½	37.788	.005
	15	45.346	.007

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel	Abscissas of developed parallel					
	Longitude interval					
	1′	1¼′	2½′	3¾′	5′	7½′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
4 00	3.036	3.795	7.590	11.386	15.181	22.771
02½	.036	.795	.590	.385	.180	.770
03¾	.036	.795	.590	.385	.180	.769
05	.036	.795	.590	.385	.179	.769
07½	.036	.795	.589	.384	.178	.768
10	3.036	3.794	7.589	11.383	15.178	22.766
11¼	.035	.794	.589	.383	.177	.766
12½	.035	.794	.588	.383	.177	.765
15	.035	.794	.588	.382	.176	.764
17½	.035	.794	.588	.381	.175	.763
18¾	.035	.794	.587	.381	.175	.762
20	3.035	3.794	7.587	11.381	15.174	22.762
22½	.035	.793	.587	.380	.174	.760
25	.035	.793	.586	.380	.173	.759
26¼	.034	.793	.586	.379	.172	.758
27½	.034	.793	.586	.379	.172	.758
30	3.034	3.793	7.585	11.378	15.171	22.756
32½	.034	.793	.585	.378	.170	.755
33¾	.034	.792	.585	.377	.170	.755
35	.034	.792	.585	.377	.169	.754
37½	.034	.792	.584	.376	.168	.753
40	3.033	3.792	7.584	11.376	15.167	22.751
41¼	.033	.792	.584	.375	.167	.751
42½	.033	.792	.583	.375	.167	.750
45	.033	.791	.583	.374	.166	.748
47½	.033	.791	.582	.374	.165	.747
48¾	.033	.791	.582	.373	.164	.746
50	3.033	3.791	7.582	11.373	15.164	22.746
52½	.033	.791	.581	.372	.163	.744
55	.032	.790	.581	.371	.162	.743
56¼	.032	.790	.581	.371	.161	.742
57½	.032	.790	.580	.371	.161	.741
5 00	3.032	3.790	7.580	11.370	15.160	22.740
02½	.032	.790	.580	.369	.159	.739
03¾	.032	.790	.579	.369	.159	.738
05	.032	.790	.579	.369	.158	.737
07½	.031	.789	.579	.368	.157	.736
10	3.031	3.789	7.578	11.367	15.157	22.734
11¼	.031	.789	.578	.367	.156	.733
12½	.031	.789	.578	.366	.155	.733
15	.031	.789	.577	.366	.154	.731
17½	.031	.788	.577	.365	.153	.730
18¾	.031	.788	.576	.364	.153	.729
20	3.030	3.788	7.576	11.364	15.152	22.728
22½	.030	.788	.575	.363	.151	.726
25	.030	.787	.575	.362	.150	.725
26¼	.030	.787	.575	.362	.149	.724
27½	.030	.787	.574	.362	.149	.723
30	3.030	3.787	7.574	11.361	15.148	22.722
32½	.029	.787	.573	.360	.147	.720
33¾	.029	.787	.573	.360	.146	.720
35	.029	.786	.573	.359	.146	.719
37½	.029	.786	.572	.359	.145	.717
40	3.029	3.786	7.572	11.358	15.144	22.716
41¼	.029	.786	.572	.357	.143	.715
42½	.029	.786	.571	.357	.143	.714
45	.028	.785	.571	.356	.141	.712
47½	.028	.785	.570	.355	.140	.710
48¾	.028	.785	.570	.355	.140	.710
50	3.028	3.785	7.570	11.354	15.139	22.709
52½	.028	.785	.569	.354	.138	.707
55	.027	.784	.568	.353	.137	.705
56¼	.027	.784	.568	.352	.136	.705
57½	.027	.784	.568	.352	.136	.704
6 00	3.027	3.784	7.567	11.351	15.135	22.702

Ordinates of developed parallel and meridional distances		
Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
′	*Inches*	*Inch*
For latitude 4°: 1¼	3.779	0.000
2½	7.558	.000
3¾	11.337	.000
5	15.115	.001
6¼	18.894	.001
7½	22.673	.002
10	30.231	.003
12½	37.788	.005
15	45.346	.007
For latitude 5°: 1¼	3.779	0.000
2½	7.558	.000
3¾	11.337	.001
5	15.116	.001
6¼	18.894	.001
7½	22.674	.002
10	30.231	.004
12½	37.789	.006
15	45.347	.009
For latitude 6°: 1¼	3.779	0.000
2½	7.558	.000
3¾	11.337	.001
5	15.116	.001
6¼	18.895	.002
7½	22.674	.003
10	30.233	.005
12½	37.791	.007
15	45.349	.010

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel	Abscissas of developed parallel					
	Longitude interval					
	1′	1¼′	2½′	3¾′	5′	7½′
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
6 00	3.027	3.784	7.567	11.351	15.135	22.702
02½	.027	.783	.567	.350	.134	.700
03¾	.027	.783	.566	.350	.133	.699
05	.027	.783	.566	.349	.132	.699
07½	.026	.783	.566	.348	.131	.697
10	3.026	3.783	7.565	11.348	15.130	22.695
11¼	.026	.782	.565	.347	.129	.694
12½	.026	.782	.564	.347	.129	.693
15	.026	.782	.564	.346	.128	.691
17½	.025	.782	.563	.345	.126	.690
18¾	.025	.781	.563	.344	.126	.689
20	3.025	3.781	7.563	11.344	15.125	22.688
22½	.025	.781	.562	.343	.124	.686
25	.025	.781	.561	.342	.123	.684
26¼	.024	.781	.561	.342	.122	.683
27½	.024	.780	.561	.341	.122	.682
30	3.024	3.780	7.560	11.340	15.120	22.681
32½	.024	.780	.560	.339	.119	.679
33¾	.024	.780	.559	.339	.118	.678
35	.024	.779	.559	.338	.118	.677
37½	.023	.779	.558	.337	.117	.675
40	3.023	3.779	7.558	11.336	15.115	22.673
41¼	.023	.779	.557	.336	.115	.672
42½	.023	.778	.557	.335	.114	.671
45	.023	.778	.556	.335	.113	.669
47½	.022	.778	.556	.334	.111	.667
48¾	.022	.778	.555	.333	.111	.666
50	3.022	3.778	7.555	11.333	15.110	22.665
52½	.022	.777	.554	.332	.109	.663
55	.021	.777	.554	.331	.107	.661
56¼	.021	.777	.553	.330	.107	.660
57½	.021	.777	.553	.330	.106	.659
7 00	3.021	3.776	7.552	11.329	15.105	22.657
02½	.021	.776	.552	.328	.103	.655
03¾	.021	.776	.551	.327	.103	.654
05	.020	.776	.551	.327	.102	.653
07½	.020	.775	.550	.326	.101	.651
10	3.020	3.775	7.550	11.325	15.099	22.649
11¼	.020	.775	.549	.324	.099	.648
12½	.020	.774	.549	.323	.098	.647
15	.019	.774	.548	.322	.097	.645
17½	.019	.774	.548	.321	.095	.643
18¾	.019	.774	.547	.321	.095	.642
20	3.019	3.773	7.547	11.320	15.094	22.641
22½	.019	.773	.546	.319	.093	.640
25	.018	.773	.546	.318	.091	.637
26¼	.018	.773	.545	.318	.090	.635
27½	.018	.772	.545	.317	.090	.634
30	3.018	3.772	7.544	11.316	15.088	22.632
32½	.017	.772	.543	.315	.087	.630
33¾	.017	.771	.543	.315	.086	.629
35	.017	.771	.543	.314	.085	.628
37½	.017	.771	.542	.313	.084	.626
40	3.017	3.771	7.541	11.312	15.082	22.624
41¼	.016	.770	.541	.311	.082	.623
42½	.016	.770	.540	.311	.081	.621
45	.016	.770	.540	.310	.079	.619
47½	.016	.769	.539	.308	.078	.617
48¾	.015	.769	.439	.308	.077	.616
50	3.015	3.769	7.538	11.307	15.076	22.615
52½	.015	.769	.537	.306	.075	.612
55	.015	.768	.537	.305	.073	.610
56¼	.015	.768	.536	.305	.073	.609
57½	.014	.768	.536	.304	.072	.608
8 00	3.014	3.768	7.535	11.303	15.070	22.606

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 6°	1¼	3.779	0.000
	2½	7.558	.000
	3¾	11.337	.001
	5	15.116	.001
	6¼	18.895	.002
	7½	22.674	.003
	10	30.233	.005
	12½	37.791	.007
	15	45.349	.010
For latitude 7°	1¼	3.779	0.000
	2½	7.558	.000
	3¾	11.338	.001
	5	15.117	.001
	6¼	18.896	.002
	7½	22.675	.003
	10	30.234	.005
	12½	37.792	.008
	15	45.351	.012
For latitude 8°	1¼	3.779	0.000
	2½	7.559	.000
	3¾	11.338	.001
	5	15.118	.001
	6¼	18.897	.002
	7½	22.676	.003
	10	30.235	.006
	12½	37.794	.010
	15	45.353	.014

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
8	00	3.014	3.768	7.535	11.303	15.070	22.606			
	02½	.014	.767	.534	.302	.069	.603	1¼	3.779	0.000
	03¾	.014	.767	.534	.301	.068	.602	2½	7.559	.000
	05	.013	.767	.534	.300	.067	.601	3¾	11.338	.001
	07½	.013	.766	.533	.299	.066	.599	5	15.118	.001
								For latitude 8° 6¼	18.897	.002
	10	3.013	3.766	7.532	11.298	15.064	22.596	7½	22.676	.003
	11¼	.013	.766	.532	.298	.063	.595	10	30.235	.006
	12½	.013	.766	.531	.297	.063	.594	12½	37.794	.010
	15	.012	.765	.531	.296	.061	.592	15	45.353	.014
	17½	.012	.765	.530	.295	.059	.589			
	18¾	.012	.765	.529	.294	.059	.588			
	20	3.012	3.764	7.529	11.293	15.058	22.587	1¼	3.780	0.000
	22½	.011	.764	.528	.292	.056	.585	2½	7.559	.000
	25	.011	.764	.527	.291	.055	.582	3¾	11.339	.001
	26¼	.011	.764	.527	.290	.054	.581	5	15.118	.002
	27½	.011	.763	.527	.290	.053	.580	For latitude 9° 6¼	18.898	.003
								7½	22.678	.004
	30	3.010	3.763	7.526	11.289	15.051	22.577	10	30.237	.007
	32½	.010	.762	.525	.287	.050	.575	12½	37.796	.011
	33¾	.010	.762	.525	.287	.049	.574	15	45.356	.015
	35	.010	.762	.524	.286	.048	.572			
	37½	.009	.762	.523	.285	.047	.570			
								1¼	3.780	0.000
	40	3.009	3.761	7.522	11.284	15.045	22.567	2½	7.560	.000
	41¼	.009	.761	.522	.283	.044	.566	3¾	11.339	.001
	42½	.009	.761	.522	.282	.043	.565	5	15.119	.002
	45	.008	.760	.521	.281	.042	.562	For latitude 10° 6¼	18.899	.003
	47½	.008	.760	.520	.280	.040	.560	7½	22.679	.004
	48¾	.008	.760	.520	.279	.039	.559	10	30.238	.008
								12½	37.798	.012
	50	3.008	3.760	7.519	11.279	15.038	22.557	15	45.358	.017
	52½	.007	.759	.518	.277	.036	.555			
	55	.007	.759	.517	.276	.035	.552			
	56¼	.007	.758	.517	.275	.034	.551			
	57½	.007	.758	.517	.275	.033	.550			
9	00	3.006	3.758	7.516	11.274	15.031	22.547			
	02½	.006	.757	.515	.272	.030	.545			
	03¾	.006	.757	.514	.272	.029	.543			
	05	.006	.757	.514	.271	.028	.542			
	07½	.005	.757	.513	.270	.026	.539			
	10	3.005	3.756	7.512	11.268	15.024	22.537			
	11¼	.005	.756	.512	.268	.024	.535			
	12½	.005	.756	.511	.267	.023	.534			
	15	.004	.755	.510	.266	.021	.531			
	17½	.004	.755	.510	.264	.019	.529			
	18¾	.004	.755	.509	.264	.018	.527			
	20	3.003	3.754	7.509	11.263	15.017	22.526			
	22½	.003	.754	.508	.262	.016	.523			
	25	.003	.753	.507	.260	.014	.521			
	26¼	.003	.753	.506	.260	.013	.519			
	27½	.002	.753	.506	.259	.012	.518			
	30	3.002	3.753	7.505	11.258	15.010	22.515			
	32½	.002	.752	.504	.256	.008	.513			
	33¾	.001	.752	.504	.256	.007	.511			
	35	.001	.752	.503	.255	.007	.510			
	37½	.001	.751	.502	.254	.005	.507			
	40	3.001	3.751	7.501	11.252	15.003	22.504			
	41¼	.000	.750	.501	.251	.002	.503			
	42½	.000	.750	.501	.251	.001	.502			
	45	.000	.750	.500	249	14.999	.499			
	47½	2.999	.749	.499	.248	.997	.496			
	48¾	.999	.749	.498	.247	.996	.494			
	50	2.999	3.749	7.498	11.247	14.995	22.493			
	52½	.999	.748	.497	.245	.993	.490			
	55	.998	.748	.496	.244	.992	.487			
	56¼	.998	.748	.495	243	.991	.486			
	57½	.998	.748	.495	.242	.990	.485			
10	00	2.998	3.747	7.494	11.241	14.988	22.482			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel					
		Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
10	00	2.998	3.747	7.494	11.241	14.988	22.482
	02½	.997	.747	.493	.239	.986	.479
	03¾	.997	.746	.493	.239	.985	.478
	05	.997	.746	.492	.238	.984	.476
	07½	.996	.746	.491	.237	.982	.473
	10	2.996	3.745	7.490	11.235	14.980	22.470
	11¼	.996	.745	.490	.234	.979	.469
	12½	.996	.745	.489	.234	.978	.467
	15	.995	.744	.488	.232	.976	.464
	17½	.995	.744	.487	.231	.974	.461
	18¾	.995	.743	.487	.230	.973	.460
	20	2.995	3.743	7.486	11.229	14.972	22.459
	22½	.994	.743	.485	.228	.970	.456
	25	.994	.742	.484	.226	.968	.452
	26¼	.994	.742	.484	.226	.967	.451
	27½	.993	.742	.483	.225	.966	.450
	30	2.993	3.741	7.482	11.223	14.964	22.447
	32½	.993	.741	.481	.222	.962	.444
	33¾	.992	.740	.481	.221	.961	.442
	35	.992	.740	.480	.220	.960	.440
	37½	.992	.740	.479	.219	.958	.437
	40	2.991	3.739	7.478	11.217	14.956	22.435
	41¼	.991	.739	.478	.216	.955	.433
	42½	.991	.739	.477	.216	.954	.431
	45	.990	.738	.476	.214	.952	.428
	47½	.990	.738	.475	.213	.950	.425
	48¾	.990	.737	.475	.212	.949	.424
	50	2.990	3.737	7.474	11.211	14.948	22.422
	52½	.989	.737	.473	.210	.946	.419
	55	.989	.736	.472	.208	.944	.416
	56¼	.989	.736	.471	.207	.943	.414
	57½	.988	.735	.471	.206	.942	.413
11	00	2.988	3.735	7.470	11.205	14.940	22.410
	02½	.988	.734	.469	.203	.938	.406
	03¾	.987	.734	.468	.202	.937	.405
	05	.987	.734	.468	.202	.936	.403
	07½	.987	.733	.467	.200	.933	.400
	10	2.986	3.733	7.466	11.199	14.931	22.397
	11¼	.986	.733	.465	.198	.930	.395
	12½	.986	.732	.465	.197	.929	.394
	15	.985	.732	.463	.195	.927	.390
	17½	.985	.731	.462	.194	.925	.387
	18¾	.985	.731	.462	.193	.924	.386
	20	2.985	3.731	7.461	11.192	14.923	22.384
	22½	.984	.730	.460	.190	.921	.381
	25	.984	.730	.459	.189	.918	.378
	26¼	.983	.729	.459	.188	.917	.376
	27½	.983	.729	.458	.187	.916	.374
	30	2.983	3.728	7.457	11.186	14.914	22.371
	32½	.982	.728	.456	.184	.912	.368
	33¾	.982	.728	.455	.183	.911	.366
	35	.982	.727	.455	.182	.910	.364
	37½	.982	.727	.454	.181	.907	.361
	40	2.981	3.726	7.453	11.179	14.905	22.358
	41¼	.981	.726	.452	.178	.904	.356
	42½	.981	.726	.451	.177	.903	.354
	45	.980	.725	.450	.176	.901	.351
	47½	.980	.725	.449	.174	.899	.348
	48¾	.979	.724	.449	.173	.897	.346
	50	2.979	3.724	7.448	11.172	14.896	22.344
	52½	.979	.724	.447	.171	.894	.341
	55	.978	.723	.446	.169	.892	.338
	56¼	.978	.723	.445	.168	.891	.336
	57½	.978	.722	.445	.167	.889	.334
12	00	2.977	3.722	7.444	11.165	14.887	22.331

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 10°	1¼	3.780	0.000
	2½	7.560	.000
	3¾	11.339	.001
	5	15.119	.002
	6¼	18.899	.003
	7½	22.679	.004
	10	30.238	.008
	12½	37.798	.012
	15	45.358	.017
For latitude 11°	1¼	3.780	0.000
	2½	7.560	.001
	3¾	11.340	.001
	5	15.120	.002
	6¼	18.900	.003
	7½	22.680	.005
	10	30.240	.008
	12½	37.801	.013
	15	45.361	.019
For latitude 12°	1¼	3.780	0.000
	2½	7.561	.001
	3¾	11.341	.001
	5	15.121	.002
	6¼	18.902	.004
	7½	22.682	.005
	10	30.243	.009
	12½	37.804	.014
	15	45.364	.020

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{240000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
12	00	2.977	3.722	7.444	11.165	14.887	22.331			
	02½	.977	.721	.442	.164	.885	.327	1¼	3.780	0.000
	03¾	.977	.721	.442	.163	.884	.326	2½	7.561	.001
	05	.977	.721	.441	.162	.883	.324	3¾	11.341	.001
	07½	.976	.720	.440	.160	.880	.320	5	15.121	.002
								For latitude 12° 6¼	18.902	.004
								7½	22.682	.005
	10	2.976	3.719	7.439	11.158	14.878	22.317	10	30.243	.009
	11¼	.975	.719	.438	.158	.877	.315	12½	37.804	.014
	12½	.975	.719	.438	.157	.876	.313	15	45.364	.020
	15	.975	.718	.437	.155	.873	.310			
	17½	.974	.718	.435	.153	.871	.306			
	18¾	.974	.717	.435	.152	.870	.305			
	20	2.974	3.717	7.434	11.151	14.869	22.303	1¼	3.781	0.000
	22½	.973	.717	.433	.150	.866	.299	2½	7.561	.001
	25	.973	.716	.432	.148	.864	.296	3¾	11.342	.001
	26¼	.973	.716	.431	.147	.863	.294	5	15.122	.002
	27½	.972	.715	.431	.146	.862	.292	For latitude 13° 6¼	18.903	.004
								7½	22.684	.005
	30	2.972	3.715	7.430	11.144	14.859	22.289	10	30.245	.010
	32½	.971	.714	.428	.143	.857	.285	12½	37.806	.015
	33¾	.971	.714	.428	.142	.856	.283	15	45.367	.022
	35	.971	.714	.427	.141	.854	.281			
	37½	.970	.713	.426	.139	.852	.278			
								1¼	3.781	0.000
	40	2.970	3.712	7.425	11.137	14.850	22.274	2½	7.562	.001
	41¼	.970	.712	.424	.136	.848	.273	3¾	11.343	.002
	42½	.969	.712	.424	.135	.847	.271	5	15.124	.003
	45	.969	.711	.422	.134	.845	.267	For latitude 14° 6¼	18.905	.004
	47½	.968	.711	.421	.132	.842	.264	7½	22.686	.006
	48¾	.968	.710	.421	.131	.841	.262	10	30.247	.010
								12½	37.809	.016
	50	2.968	3.710	7.420	11.130	14.840	22.260	15	45.371	.023
	52½	.967	.709	.419	.128	.837	.256			
	55	.967	.709	.417	.126	.835	.252			
	56¼	.967	.708	.417	.125	.834	.251			
	57½	.966	.708	.416	.124	.832	.249			
13	00	2.966	3.708	7.415	11.123	14.830	22.245			
	02½	.966	.707	.414	.121	.828	.241			
	03¾	.965	.707	.413	.120	.826	.240			
	05	.965	.706	.413	.119	.825	.238			
	07½	.965	.706	.411	.117	.823	.234			
	10	2.964	3.705	7.410	11.115	14.820	22.230			
	11¼	.964	.705	.409	.114	.819	.228			
	12½	.964	.704	.409	.113	.818	.226			
	15	.963	.704	.408	.111	.815	.223			
	17½	.963	.703	.406	.109	.813	.219			
	18¾	.962	.703	.406	.108	.811	.217			
	20	2.962	3.703	7.405	11.107	14.810	22.215			
	22½	.961	.702	.404	.106	.807	.211			
	25	.961	.701	.402	.104	.805	.207			
	26¼	.961	.701	.402	.103	.804	.205			
	27½	.960	.701	.401	.102	.802	.204			
	30	2.960	3.700	7.400	11.100	14.800	22.200			
	32½	.959	.699	.398	.098	.797	.196			
	33¾	.959	.699	.398	.097	.796	.194			
	35	.959	.699	.397	.096	.795	.192			
	37½	.958	.698	.396	.094	.792	.188			
	40	2.958	3.697	7.395	11.092	14.790	22.184			
	41¼	.958	.697	.394	.091	.788	.182			
	42½	.957	.697	.393	.090	.787	.180			
	45	.957	.696	.392	.088	.784	.176			
	47½	.956	.695	.391	.086	.782	.172			
	48¾	.956	.695	.390	.085	.780	.170			
	50	2.956	3.695	7.390	11.084	14.779	22.169			
	52½	.955	.694	.388	.082	.776	.165			
	55	.955	.693	.387	.080	.774	.161			
	56¼	.954	.693	.386	.079	.772	.159			
	57½	.954	.693	.386	.078	.771	.157			
14	00	2.954	3.692	7.384	11.076	14.769	22.153			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances			
		Longitude interval						Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′				
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*		′	*Inches*	*Inch*
14	00	2.954	3.692	7.384	11.076	14.769	22.153	For latitude 14°	1¼	3.781	0.000
	02½	.953	.691	.383	.074	.766	.149		2½	7.562	.001
	03¾	.953	.691	.382	.073	.764	.147		3¾	11.343	.002
	05	.953	.691	.381	.072	.763	.145		5	15.124	.003
	07½	.952	.690	.380	.070	.760	.141		6¼	18.905	.004
									7½	22.686	.006
	10	2.952	3.689	7.379	11.068	14.758	22.137		10	30.247	.010
	11¼	.951	.689	.378	.067	.756	.135		12½	37.809	.016
	12½	.951	.689	.378	.066	.755	.132		15	45.371	.023
	15	.950	.688	.376	.064	.752	.128				
	17½	.950	.687	.375	.062	.750	.124				
	18¾	.950	.687	.374	.061	.748	.122				
	20	2.949	3.687	7.373	11.060	14.747	22.120				
	22½	.949	.686	.372	.058	.744	.116				
	25	.948	.685	.371	.056	.741	.112				
	26¼	.948	.685	.370	.055	.740	.110				
	27½	.948	.685	.369	.054	.739	.108				
	30	2.947	3.684	7.368	11.052	14.736	22.104				
	32½	.947	.683	.367	.050	.733	.100				
	33¾	.946	.683	.366	.049	.732	.098				
	35	.946	.683	.365	.048	.730	.096				
	37½	.946	.682	.364	.046	.728	.091				
	40	2.945	3.681	7.362	11.044	14.725	22.087				
	41¼	.944	.681	.362	.043	.723	.085				
	42½	.944	.681	.361	.042	.722	.083				
	45	.944	.680	.360	.039	.719	.079				
	47½	.943	.679	.358	.037	.717	.075				
	48¾	.943	.679	.358	.036	.715	.073				
	50	2.943	3.678	7.357	11.035	14.714	22.071				
	52½	.942	.678	.355	.033	.711	.066				
	55	.942	.677	.354	.031	.708	.062				
	56¼	.941	.677	.353	.030	.707	.060				
	57½	.941	.676	.353	.029	.705	.058				
15	00	2.940	3.676	7.351	11.027	14.702	22.054				
	02½	.940	.675	.350	.025	.700	.049				
	03¾	.940	.675	.349	.024	.698	.047				
	05	.939	.674	.348	.023	.697	.045				
	07½	.939	.673	.347	.020	.694	.041				
	10	2.938	3.673	7.345	11.018	14.691	22.036				
	11¼	.938	.672	.345	.017	.689	.034				
	12½	.938	.672	.344	.016	.688	.032				
	15	.937	.671	.343	.014	.685	.028				
	17½	.936	.671	.341	.012	.682	.023				
	18¾	.936	.670	.340	.011	.681	.021				
	20	2.936	3.670	7.340	11.009	14.679	22.019				
	22½	.935	.669	.338	.007	.676	.014				
	25	.935	.668	.337	.005	.673	.010				
	26¼	.934	.668	.336	.004	.672	.008				
	27½	.934	.668	.335	.003	.670	.006				
	30	2.934	3.667	7.334	11.001	14.668	22.001				
	32½	.933	.666	.332	10.999	.665	21.997				
	33¾	.933	.666	.332	.997	.663	.995				
	35	.932	.665	.331	.996	.662	.993				
	37½	.932	.665	.329	.994	.659	.988				
	40	2.931	3.664	7.328	10.992	14.656	21.984				
	41¼	.931	.664	.327	.991	.654	.981				
	42½	.931	.663	.326	.990	.653	.979				
	45	.930	.662	.325	.987	.650	.975				
	47½	.929	.662	.323	.985	.647	.970				
	48¾	.929	.661	.322	.984	.645	.968				
	50	2.929	3.661	7.322	10.983	14.644	21.966				
	52½	.928	.660	.320	.981	.641	.961				
	55	.928	.659	.319	.978	.638	.957				
	56¼	.927	.659	.318	.977	.636	.954				
	57½	.927	.659	.317	.976	.635	.952				
16	00	2.926	3.658	7.316	10.974	14.632	21.948				

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
16	00	2.926	3.658	7.316	10.974	14.632	21.948			
	02½	.926	.657	.314	.972	.629	.943	1¼	3.781	0.000
	03¾	.925	.657	.314	.970	.627	.941	2½	7.563	.001
	05	.925	.656	.313	.969	.626	.938	3¾	11.345	.002
	07½	.925	.656	.311	.967	.623	.934	5	15.126	.003
								For latitude 16° 6¼	18.908	.005
	10	2.924	3.655	7.310	10.965	14.620	21.929	7½	22.690	.007
	11¼	.924	.655	.309	.964	.618	.927	10	30.253	.012
	12½	.923	.654	.308	.962	.617	.925	12½	37.816	.018
	15	.922	.653	.307	.960	.614	.920	15	45.379	.026
	17½	.922	.653	.305	.958	.610	.916			
	18¾	.921	.652	.304	.957	.609	.913			
								1¼	3.782	0.000
	20	2.921	3.652	7.304	10.955	14.607	21.911	2½	7.564	.001
	22½	.921	.651	.302	.953	.604	.907	3¾	11.346	.002
	25	.920	.650	.300	.951	.601	.901	5	15.128	.003
	26¼	.920	.650	.300	.950	.599	.899	For latitude 17° 6¼	18.910	.005
	27½	.920	.649	.299	.948	.598	.897	7½	22.692	.007
								10	30.256	.012
	30	2.919	3.649	7.297	10.946	14.595	21.892	12½	37.820	.019
	32½	.918	.648	.296	.944	.592	.888	15	45.384	.028
	33¾	.918	.648	.295	.943	.590	.885			
	35	.918	.647	.294	.941	.589	.883			
	37½	.917	.646	.293	.939	.585	.878			
								1¼	3.782	0.000
	40	2.916	3.646	7.291	10.937	14.582	21.874	2½	7.565	.001
	41¼	.916	.645	.290	.936	.581	.871	3¾	11.347	.002
	42½	.916	.645	.290	.934	.579	.869	5	15.129	.003
	45	.915	.644	.288	.932	.576	.864	For latitude 18° 6¼	18.912	.005
	47½	.915	.643	.286	.930	.573	.859	7½	22.694	.007
	48¾	.914	.643	.286	.928	.571	.857	10	30.259	.013
								12½	37.824	.020
	50	2.914	3.642	7.285	10.927	14.570	21.855	15	45.388	.029
	52½	.913	.642	.283	.925	.566	.850			
	55	.913	.641	.282	.922	.563	.845			
	56¼	.912	.640	.281	.921	.562	.842			
	57½	.912	.640	.280	.920	.560	.840			
17	00	2.911	3.639	7.278	10.918	14.557	21.835			
	02½	.911	.638	.277	.915	.554	.830			
	03¾	.910	.638	.276	.914	.552	.828			
	05	.910	.638	.275	.913	.550	.826			
	07½	.909	.637	.274	.910	.547	.821			
	10	2.909	3.636	7.272	10.908	14.544	21.816			
	11¼	.908	.636	.271	.907	.542	.813			
	12½	.908	.635	.270	.906	.541	.811			
	15	.907	.634	.269	.903	.537	.806			
	17½	.907	.634	.267	.901	.534	.801			
	18¾	.906	.633	.266	.899	.532	.799			
	20	2.906	3.633	7.265	10.898	14.531	21.796			
	22½	.905	.632	.264	.896	.528	.791			
	25	.905	.631	.262	.893	.524	.786			
	26¼	.904	.631	.261	.892	.523	.784			
	27½	.904	.630	.260	.891	.521	.781			
	30	2.904	3.629	7.259	10.888	14.518	21.777			
	32½	.903	.629	.257	.886	.514	.772			
	33¾	.903	.628	.256	.884	.513	.769			
	35	.902	.628	.255	.883	.511	.766			
	37½	.902	.627	.254	.881	.508	.762			
	40	2.901	3.626	7.253	10.878	14.504	21.757			
	41¼	.901	.626	.251	.877	.503	.754			
	42½	.900	.625	.251	.876	.501	.752			
	45	.900	.624	.249	.873	.498	.747			
	47½	.899	.624	.247	.871	.494	.741			
	48¾	.899	.623	.246	.869	.493	.739			
	50	2.898	3.623	7.245	10.868	14.491	21.736			
	52½	.898	.622	.244	.866	.488	.731			
	55	.897	.621	.242	.863	.484	.726			
	56¼	.896	.621	.241	.862	.483	.724			
	57½	.896	.620	.240	.861	.481	.721			
18	00	2.895	3.619	7.239	10.858	14.477	21.716			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
18	00	2.895	3.619	7.239	10.858	14.477	21.716
	02½	.895	.618	.237	.855	.474	.711
	03¾	.894	.618	.236	.854	.472	.708
	05	.894	.618	.235	.853	.471	.706
	07½	.893	.617	.234	.850	.467	.701
	10	2.893	3.616	7.232	10.848	14.464	21.696
	11¼	.892	.616	.231	847	.462	.693
	12½	.892	.615	.230	.845	.460	.690
	15	.891	.614	.228	.843	.457	.685
	17½	.891	.613	.227	.840	.453	.680
	18¾	.890	.613	.226	.839	.452	.678
	20	2.890	3.612	7.225	10.837	14.450	21.675
	22½	.889	.612	.223	.835	.447	.670
	25	.889	.611	.222	.832	.443	.665
	26¼	.888	.610	.221	.831	.441	.662
	27½	.888	.610	.220	.830	.440	.659
	30	2.887	3.609	7.218	10.827	14.436	21.654
	32½	.887	.608	.216	.824	.433	.649
	33¾	.886	.608	.215	.823	.431	.646
	35	.886	.607	.215	.822	.429	.644
	37½	.885	.606	.213	.819	.426	.638
	40	2.884	3.606	7.211	10.817	14.422	21.633
	41¼	.884	.605	.210	815	.420	.629
	42½	.884	.605	.209	.814	.419	.628
	45	.883	.604	.208	.811	.415	.623
	47½	.882	.603	.206	.809	.411	.617
	48¾	.882	.602	.205	.807	.410	.615
	50	2.882	3.602	7.204	10.806	14.408	21.612
	52½	.881	.601	.202	.803	.404	.607
	55	.880	.600	.200	.801	.401	.601
	56¼	.880	.600	.199	.799	.399	.598
	57½	.879	.599	.199	.798	.397	.596
19	00	2.879	3.598	7.197	10.795	14.394	21.591
	02½	.878	.598	.195	.793	.390	.585
	03¾	.878	.597	.194	.791	.388	.582
	05	.877	.597	.193	.790	.386	.580
	07½	.877	.596	.191	.787	.383	.574
	10	2.876	3.595	7.190	10.784	14.379	21.569
	11¼	.875	.594	.189	.783	.377	.566
	12½	.875	.594	.188	.782	.376	.563
	15	.874	.593	.186	.779	.372	.558
	17½	.874	.592	.184	.776	.368	.553
	18¾	.873	.592	.183	.775	.367	.550
	20	2.873	3.591	7.182	10.774	14.365	21.547
	22½	.872	.590	.181	.771	.361	.542
	25	.872	.589	.179	.768	.357	.536
	26¼	.871	.589	.178	.766	.356	.533
	27½	.871	.588	.177	.765	.354	.531
	30	2.870	3.588	7.175	10.763	14.350	21.525
	32½	.869	.587	.173	.760	.346	.520
	33¾	.869	.586	.172	.758	.345	.517
	35	.869	.586	.171	.757	.343	.514
	37½	.868	.585	.169	.754	.339	.508
	40	2.867	3.584	7.168	10.751	14.335	21.503
	41¼	.867	.583	.167	.750	.333	.500
	42½	.866	.583	.166	.749	.332	.497
	45	.866	.582	.164	.746	.328	.492
	47½	.865	.581	.162	.743	.324	.486
	48¾	.865	.581	.161	.742	.322	.484
	50	2.864	3.580	7.160	10.740	14.321	21.481
	52½	.863	.579	.158	.738	.317	.475
	55	.863	.578	.156	.735	.313	.469
	56¼	.862	.578	.156	.733	.311	.467
	57½	.862	.577	.155	.732	.309	.464
20	00	2.861	3.576	7.153	10.729	14.305	21.458

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 18°	1¼	3.782	0.000
	2½	7.565	.001
	3¾	11.347	.002
	5	15.129	.003
	6¼	18.912	.005
	7½	22.694	.007
	10	30.259	.013
	12½	37.824	.020
	15	45.388	.029
For latitude 19°	1¼	3.783	0.000
	2½	7.565	.001
	3¾	11.348	.002
	5	15.131	.003
	6¼	18.914	.005
	7½	22.697	.008
	10	30.262	.014
	12½	37.828	.021
	15	45.393	.031
For latitude 20°	1¼	3.783	0.000
	2½	7.566	.001
	3¾	11.350	.002
	5	15.133	.004
	6¼	18.916	.006
	7½	22.699	.008
	10	30.265	.014
	12½	37.832	.022
	15	45.398	.032

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude interval	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
20	00	2.861	3.576	7.153	10.729	14.305	21.458			
	02½	.860	.575	.151	.726	.302	.452	1¼	3.783	0.000
	03¾	.860	.575	.150	.725	.300	.450	2½	7.566	.001
	05	.860	.574	.149	.723	.298	.447	3¾	11.350	.002
	07½	.859	.574	.147	.721	.294	.441	5	15.133	.004
								For latitude 20° 6¼	18.916	.006
	10	2.858	3.573	7.145	10.718	14.290	21.436	7½	22.699	.008
	11¼	.858	.572	.144	.715	.288	.433	10	30.265	.014
	12½	.857	.572	.143	.715	.287	.430	12½	37.832	.022
	15	.857	.571	.141	.712	.283	.424	15	45.398	.032
	17½	.856	.570	.139	.709	.279	.418			
	18¾	.855	.569	.139	.708	.277	.416			
	20	2.855	3.569	7.138	10.706	14.275	21.413	1¼	3.784	0.000
	22½	.854	.568	.136	.703	.271	.407	2½	7.567	.001
	25	.853	.567	.134	.701	.267	.401	3¾	11.351	.002
	26¼	.853	.566	.133	.699	.265	.398	5	15.134	.004
	27½	.853	.566	.132	.698	.264	.395	For latitude 21° 6¼	18.918	.006
								7½	22.702	.008
	30	2.852	3.565	7.130	10.695	14.260	21.390	10	30.269	.015
	32½	.851	.564	.128	.692	.256	.384	12½	37.837	.023
	33¾	.851	.563	.127	.690	.254	.381	15	45.403	.033
	35	.850	.563	.126	.689	.252	.378			
	37½	.850	.562	.124	.686	.248	.372			
	40	2.849	3.561	7.122	10.683	14.244	21.366	1¼	3.784	0.000
	41¼	.848	.561	.121	.682	.242	.363	2½	7.568	.001
	42½	.848	.560	.120	.680	.240	.361	3¾	11.352	.002
	45	.847	.559	.118	.677	.237	.355	5	15.136	.004
	47½	.847	.558	.116	.674	.233	.349	For latitude 22° 6¼	18.921	.006
	48¾	.846	.558	.115	.673	.231	.346	7½	22.705	.009
								10	30.272	.015
	50	2.846	3.557	7.114	10.672	14.229	21.343	12½	37.841	.024
	52½	.845	.556	.112	.669	.225	.337	15	45.409	.035
	55	.844	.555	.110	.666	.221	.331			
	56¼	.844	.555	.110	.664	.219	.328			
	57½	.843	.554	.108	.663	.217	.325			
21	00	2.843	3.553	7.106	10.660	14.213	21.319			
	02½	.842	.552	.004	.657	.209	.313			
	03¾	.841	.552	.104	.655	.207	.311			
	05	.841	.551	.103	.654	.205	.308			
	07½	.840	.550	.101	.651	.201	.302			
	10	2.839	3.549	7.099	10.648	14.197	21.296			
	11¼	.839	.549	.098	.646	.195	.294			
	12½	.839	.548	.097	.645	.193	.290			
	15	.838	.547	.095	.642	.189	.284			
	17½	.837	.546	.093	.639	.185	.278			
	18¾	.837	.546	.092	.637	.183	.275			
	20	2.836	3.545	7.091	10.636	14.181	21.272			
	22½	.835	.544	.089	.633	.177	.266			
	25	.835	.543	.087	.630	.173	.260			
	26¼	.834	.543	.086	.628	.171	.257			
	27½	.834	.542	.085	.627	.169	.254			
	30	2.833	3.541	7.083	10.624	14.165	21.248			
	32½	.832	.540	.081	.621	.161	.242			
	33¾	.832	.540	.080	.619	.159	.239			
	35	.831	.539	.078	.618	.157	.235			
	37½	.831	.538	.076	.615	.153	.229			
	40	2.830	3.537	7.074	10.612	14.149	21.223			
	41¼	.829	.537	.073	.610	.147	.220			
	42½	.829	.536	.072	.609	.145	217			
	45	.828	.535	.070	.606	.141	.211			
	47½	.827	.534	.068	.602	.137	.205			
	48¾	.827	.534	.067	.601	.135	.202			
	50	2.827	3.533	7.066	10.599	14.133	21.199			
	52½	.826	.532	.064	.596	.128	.193			
	55	.825	.531	.062	.593	.124	.187			
	56¼	.825	.531	.061	.592	.122	.183			
	57½	.824	.530	.060	.590	.120	.180			
22	00	2.823	3.529	7.058	10.587	14.116	21.174			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances			
		Longitude interval						Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′				
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*		′	*Inches*	*Inch*
22	00	2.823	3.529	7.058	10.587	14.116	21.174				
	02½	.822	.528	.056	.584	.112	.168		1¼	3.784	0.000
	03¾	.822	.527	.055	.582	.110	.165		2½	7.568	.001
	05	.822	.527	.054	.581	.108	.162		3¾	11.352	.002
	07½	.821	.526	.052	.578	.104	.156	For latitude 22°	5	15.136	.004
									6¼	18.921	.006
	10	2.820	3.525	7.050	10.575	14.100	21.149		7½	22.705	.009
	11¼	.819	.524	.049	.573	.097	.146		10	30.272	.015
	12½	.819	.524	.048	.572	.095	.143		12½	37.841	.024
	15	.818	.523	.046	.568	.091	.137		15	45.409	.035
	17½	.817	.522	.044	.565	.087	.131				
	18¾	.817	.521	.043	.564	.085	.128				
									1¼	3.784	0.000
	20	2.817	3.521	7.041	10.562	14.083	21.124		2½	7.569	.001
	22½	.816	.520	.039	.559	.079	.118		3¾	11.354	.002
	25	.815	.519	.037	.556	.074	.112		5	15.138	.004
	26¼	.815	.518	.036	.554	.072	.109	For latitude 23°	6¼	18.923	.006
	27½	.814	.518	.035	.553	.070	.105		7½	22.707	.009
									10	30.276	.016
	30	2.813	3.517	7.033	10.550	14.066	21.099		12½	37.846	.025
	32½	.812	.515	.031	.546	.062	.093		15	45.415	.036
	33¾	.812	.515	.030	.545	.060	.090				
	35	.811	.514	.029	.543	.058	.087				
	37½	.811	.513	.027	.540	.053	.080				
									1¼	3.785	0.000
	40	2.810	3.512	7.025	10.537	14.049	21.074		2½	7.570	.001
	41¼	.809	.512	.024	.535	.047	.071		3¾	11.355	.002
	42½	.809	.511	.022	.534	.045	.067		5	15.140	.004
	45	.808	.510	.020	.530	.041	.061	For latitude 24°	6¼	18.925	.006
	47½	.807	.509	.019	.527	.036	.055		7½	22.710	.009
	48¾	.807	.509	.017	.526	.034	.051		10	30.280	.016
									12½	37.851	.026
	50	2.806	3.508	7.016	10.524	14.032	21.048		15	45.421	.037
	52½	.806	.507	.014	.521	.028	.042				
	55	.805	.506	.012	.518	.024	.035				
	56¼	.804	.505	.011	.516	.021	.032				
	57½	.804	.505	.010	.515	.019	.029				
23	00	2.803	3.504	7.008	10.511	14.015	21.023				
	02½	.802	.503	.005	.508	.011	.016				
	03¾	.802	.502	.004	.506	.009	.013				
	05	.801	.502	.003	.505	.006	.010				
	07½	.800	.501	.001	.502	.002	.003				
	10	2.800	3.499	6.999	10.498	13.998	20.997				
	11¼	.799	.499	.998	.497	.996	.994				
	12½	.799	.498	.997	.495	.994	.990				
	15	.798	.497	.995	.492	.989	.984				
	17½	.797	.496	.992	.489	.985	.977				
	18¾	.797	.496	.991	.487	.983	.974				
	20	2.796	3.495	6.990	10.485	13.980	20.971				
	22½	.795	.494	.988	.482	.976	.964				
	25	.794	.493	.986	.479	.972	.957				
	26¼	.794	.492	.985	.477	.969	.954				
	27½	.793	.492	.984	.475	.967	.951				
	30	2.793	3.491	6.981	10.472	13.963	20.944				
	32½	.792	.490	.979	.469	.958	.938				
	33¾	.791	.489	.978	.467	.956	.934				
	35	.791	.489	.977	.466	.954	.931				
	37½	.790	.487	.975	.462	.950	.925				
	40	2.789	3.486	6.973	10.459	13.945	20.918				
	41¼	.789	.486	.972	.457	.943	.915				
	42½	.788	.485	.970	456	.941	.911				
	45	.787	.484	.968	.452	.937	.905				
	47½	.786	.483	.966	.449	.932	.898				
	48¾	.786	.482	.965	.447	.930	.895				
	50	2.786	3.482	6.964	10.446	13.928	20.891				
	52½	.785	.481	.962	.442	.923	.885				
	55	.784	.480	.959	.439	.919	.878				
	56¼	.783	.479	.958	.437	.916	.875				
	57½	.783	.479	.957	.436	.914	.871				
24	00	2.782	3.477	6.955	10.432	13.910	20.865				

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel					
		Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
24	00	2.782	3.477	6.955	10.432	13.910	20.865
	02½	.781	.476	.953	.429	.905	.858
	03¾	.781	.476	.952	.427	.903	.855
	05	.780	.475	.950	.426	.901	.851
	07½	.779	.474	.948	.422	.896	.844
	10	2.778	3.473	6.946	10.419	13.892	20.838
	11¼	.778	.472	.945	.417	.889	.834
	12½	.777	.472	.944	.415	.887	.831
	15	.777	.471	.941	.412	.883	.824
	17½	.776	.470	.939	.409	.878	.817
	18¾	.775	.469	.938	.407	.876	.814
	20	2.775	3.468	6.937	10.405	13.874	20.811
	22½	.774	.467	.935	.402	.869	.804
	25	.773	.466	.932	.398	.864	.797
	26¼	.772	.466	.931	.397	.862	.793
	27½	.772	.465	.930	.395	.860	.790
	30	2.771	3.464	6.928	10.392	13.855	20.783
	32½	.770	.463	.925	.388	.851	.776
	33¾	.770	.462	.924	.386	.849	.773
	35	.769	.462	.923	.385	.846	.769
	37½	.768	.460	.921	.381	.842	.763
	40	2.767	3.459	6.919	10.378	13.837	20.756
	41¼	.767	.459	.917	.376	.835	.752
	42½	.766	.458	.916	.374	.833	.749
	45	.766	.457	.914	.371	.828	.742
	47½	.765	.456	.912	.367	.823	.735
	48¾	.764	.455	.911	.366	.821	.732
	50	2.764	3.455	6.909	10.364	13.819	20.728
	52½	.763	.454	.907	.361	.814	.721
	55	.762	.452	.905	.357	.809	.714
	56¼	.761	.452	.904	.355	.807	.711
	57½	.761	.451	.902	.354	.805	.707
25	00	2.760	3.450	6.900	10.350	13.800	20.700
	02½	.759	.449	.898	.347	.796	.693
	03¾	.759	.448	.897	.345	.793	.690
	05	.758	.448	.895	.343	.791	.686
	07½	.757	.447	.893	.340	.786	.679
	10	2.756	3.445	6.891	10.336	13.781	20.672
	11¼	.756	.445	.890	.334	.779	.669
	12½	.755	.444	.888	.333	.777	.665
	15	.754	.443	.886	.329	.772	.658
	17½	.753	.442	.884	.325	.767	.651
	18¾	.753	.441	.882	.324	.765	.647
	20	2.753	3.441	6.881	10.322	13.763	20.644
	22½	.752	.439	.879	.318	.758	.637
	25	.751	.438	.877	.315	.753	.630
	26¼	.750	.438	.875	.313	.751	.626
	27½	.750	.437	.874	.311	.748	.623
	30	2.749	3.436	6.872	10.308	13.744	20.616
	32½	.748	.435	.870	.304	.739	.609
	33¾	.747	.434	.868	.302	.737	.605
	35	.747	.434	.867	.301	734	.601
	37½	.746	.432	.865	.297	.729	.594
	40	2.745	3.431	6.862	10.294	13.725	20.587
	41¼	.744	.431	.861	.292	.722	.583
	42½	.744	.430	.860	.290	.720	.580
	45	.743	.429	.858	.286	.715	.573
	47½	.742	.428	.855	.283	.710	.565
	48¾	.742	.427	.854	.281	.708	.562
	50	2.741	3.426	6.853	10.279	13.706	20.558
	52½	.740	.425	.850	.276	.701	.551
	55	.739	.424	.848	.272	.696	.544
	56¼	.739	.423	.847	.270	.694	.540
	57½	.738	.423	.846	.268	.691	.537
26	00	2.737	3.422	6.843	10.265	13.686	20.530

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 24°	1¼	3.785	0.000
	2½	7.570	.001
	3¾	11.355	.002
	5	15.140	.004
	6¼	18.925	.006
	7½	22.710	.009
	10	30.280	.016
	12½	37.851	.026
	15	45.421	.037
For latitude 25°	1¼	3.786	0.000
	2½	7.571	.001
	3¾	11.357	.002
	5	15.142	.004
	6¼	18.928	.007
	7½	22.713	.010
	10	30.284	.017
	12½	37.856	.026
	15	45.426	.038
For latitude 26°	1¼	3.786	0.000
	2½	7.572	.001
	3¾	11.358	.002
	5	15.144	.004
	6¼	18.931	.007
	7½	22.717	.010
	10	30.289	.017
	12½	37.861	.027
	15	45.433	.039

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel					
		Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
26	00	2.737	3.422	6.843	10.265	13.686	20.530
	02½	.736	.420	.841	.261	.682	.522
	03¾	.736	.420	.840	.259	.679	.519
	05	.735	.419	.838	.258	.677	.515
	07½	.734	.418	.836	.256	.672	.508
	10	2.733	3.417	6.833	10.250	13.667	20.500
	11¼	.733	.416	.832	.248	.665	.497
	12½	.732	.416	.831	.247	.662	.493
	15	.731	.414	.829	.243	.657	.486
	17½	.730	.413	.826	.239	.652	.478
	18¾	.730	.412	.825	.237	.650	.475
	20	2.729	3.412	6.824	10.236	13.647	20.471
	22½	.728	.411	.821	.232	.643	.464
	25	.727	.409	.819	.228	.638	.456
	26¼	.727	.409	.818	.226	.635	.453
	27½	.727	.408	.816	.225	.633	.449
	30	2.726	3.407	6.814	10.221	13.628	20.442
	32½	.725	.406	.811	.217	.623	.434
	33¾	.724	.405	.810	.215	.620	.431
	35	.724	.404	.809	.213	.618	.427
	37½	.723	.403	.807	.210	.613	.420
	40	2.722	3.402	6.804	10.206	13.608	20.412
	41¼	.721	.401	.803	.204	.606	.408
	42½	.721	.401	.802	.202	.603	.405
	45	.720	.400	.799	.199	.598	.397
	47½	.719	.398	.797	.195	.593	.390
	48¾	.718	.398	.795	.193	.591	.386
	50	2.718	3.397	6.794	10.191	13.588	20.383
	52½	.717	.396	.792	.188	.583	.375
	55	.716	.395	.789	.184	.578	.368
	56¼	.715	.394	.788	.182	.576	.364
	57½	.715	.393	.787	.180	.573	.360
27	00	2.714	3.392	6.784	10.176	13.568	20.353
	02½	.713	.391	.782	.173	.563	.345
	03¾	.712	.390	.780	.171	.561	.341
	05	.712	.390	.779	.169	.558	.338
	07½	.711	.388	.777	.165	.553	.330
	10	2.710	3.387	6.774	10.161	13.548	20.323
	11¼	.709	.386	.773	.159	.546	.319
	12½	.709	.386	.772	.157	.543	.315
	15	.708	.384	.769	.154	.538	.307
	17½	.707	.383	.767	.150	.533	.300
	18¾	.706	.383	.765	.148	.531	.296
	20	2.706	3.382	6.764	10.146	13.528	20.292
	22½	.705	.381	.762	.142	.523	.285
	25	.704	.380	.759	.139	.518	.277
	26¼	.703	.379	.758	.137	.516	273
	27½	.703	.378	.756	.135	.513	.269
	30	2.702	3.377	6.754	10.131	13.508	20.262
	32½	.701	.376	.751	.127	.503	.254
	33¾	.700	.375	.750	.125	.500	.250
	35	.700	.374	.749	.123	.498	.247
	37½	.699	.373	.746	.119	.493	.239
	40	2.697	3.372	6.744	10.116	13.488	20.231
	41¼	.697	.371	.742	.114	.485	.227
	42½	.696	.371	.741	.112	.482	.224
	45	.696	.369	.739	.108	.477	.216
	47½	.694	.368	.736	.104	.472	.208
	48¾	.694	.367	.735	.102	.470	.204
	50	2.693	3.367	6.734	10.100	13.467	20.201
	52½	.692	.365	.731	.096	.462	.193
	55	.691	.364	.728	.093	.457	.185
	56¼	.691	.364	.727	.091	.454	.181
	57½	.690	.363	.726	.089	.452	.177
28	00	2.689	3.362	6.723	10.085	13.446	20.170

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 26°	1¼	3.786	0.000
	2½	7.572	.001
	3¾	11.358	.002
	5	15.144	.004
	6¼	18.931	.007
	7½	22.717	.010
	10	30.289	.017
	12½	37.861	.027
	15	45.433	.039
For latitude 27°	1¼	3.787	0.000
	2½	7.573	.001
	3¾	11.360	.003
	5	15.146	.004
	6¼	18.933	.007
	7½	22.720	.010
	10	30.293	.018
	12½	37.867	.028
	15	45.439	.040
For latitude 28°	1¼	3.787	0.000
	2½	7.574	.001
	3¾	11.362	.003
	5	15.148	.005
	6¼	18.936	.007
	7½	22.723	.010
	10	30.297	.018
	12½	37.872	.029
	15	45.446	.041

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
28	00	2.689	3.362	6.723	10.085	13.446	20.170	1¼	3.787	0.000
	02½	.688	.360	.721	.081	.441	.162	2½	7.574	.001
	03¾	.688	.360	.719	.079	.439	.158	3¾	11.362	.003
	05	.687	.359	.718	.077	.436	.154	5	15.148	.005
	07½	.686	.358	.715	.073	.431	.146	For latitude 28° 6¼	18.936	.007
								7½	22.723	.010
	10	2.685	3.356	6.713	10.069	13.426	20.138	10	30.297	.018
	11¼	.685	.356	.711	.067	.423	.134	12½	37.872	.029
	12½	.684	.355	.710	.065	.420	.131	15	45.446	.041
	15	.683	.354	.708	.061	.415	.123			
	17½	.682	.353	.705	.057	.410	.115			
	18¾	.681	.352	.704	.055	.407	.111			
								1¼	3.788	0.000
	20	2.681	3.351	6.702	10.054	13.405	20.107	2½	7.575	.001
	22½	.680	.350	.700	.050	.399	.099	3¾	11.363	.003
	25	.679	.349	.697	.046	.394	.091	5	15.151	.005
	26¼	.678	.348	.696	.044	.392	.086	For latitude 29° 6¼	18.939	.007
	27½	.678	.347	.694	.042	.389	.083	7½	22.726	.011
								0	30.302	.019
	30	2.677	3.346	6.692	10.038	13.384	20.076	12½	37.878	.029
	32½	.676	.345	.689	.034	.378	.068	15	45.453	.042
	33¾	.675	.344	.688	.032	.376	.064			
	35	.675	.343	.687	.030	.373	.060			
	37½	.674	.342	.684	.026	.368	.052			
								1¼	3.788	0.000
	40	2.673	3.341	6.681	10.022	13.363	20.044	2½	7.577	.001
	41¼	.672	.340	.680	.020	.360	.040	3¾	11.365	.003
	42½	.671	.339	.679	.018	.357	.036	5	15.153	.005
	45	.670	.338	.676	.014	.352	.028	For latitude 30° 6¼	18.942	.007
	47½	.669	.337	.673	.010	.347	.020	7½	22.730	.011
	48¾	.669	.336	.672	.008	.344	.016	10	30.306	.019
								12½	37.884	.030
	50	2.668	3.335	6.671	10.006	13.342	20.012	15	45.460	.043
	52½	.667	.334	.668	.002	.336	.004			
	55	.666	.333	.665	9.998	.331	19.996			
	56¼	.666	.332	.664	.996	.328	.992			
	57½	.665	.331	.663	.994	.326	.988			
29	00	2.664	3.330	6.660	9.990	13.320	19.980			
	02½	.663	.329	.657	.986	.315	.972			
	03¾	.662	.328	.656	.984	.312	.968			
	05	.662	.327	.655	.982	.309	.964			
	07½	.661	.326	.652	.978	.304	.956			
	10	2.660	3.325	6.649	9.974	13.299	19.948			
	11¼	.659	.324	.648	.972	.296	.944			
	12½	.659	.323	.647	.970	.293	.940			
	15	.658	.322	.644	.966	.288	.932			
	17½	.657	.321	.641	.962	.283	.924			
	18¾	.656	.320	.640	.960	.280	.920			
	20	2.655	3.319	6.639	9.958	13.277	19.916			
	22½	.654	.318	.636	.954	.272	.908			
	25	.653	.317	.633	.950	.266	.900			
	26¼	.653	.316	.632	.948	.264	.896			
	27½	.652	.315	.630	.946	.261	.891			
	30	2.651	3.314	6.628	9.942	13.256	19.883			
	32½	.650	.313	.625	.938	.250	.875			
	33¾	.649	.312	.624	.936	.247	.871			
	35	.649	.311	.622	.933	.245	.867			
	37½	.648	.310	.620	.929	.239	.859			
	40	2.647	3.308	6.617	9.925	13.234	19.851			
	41¼	.646	.308	.616	.923	.231	.847			
	42½	.646	.307	.614	.921	.228	.842			
	45	.644	.306	.611	.917	.223	.834			
	47½	.643	.304	.609	.913	.217	.826			
	48¾	.643	.304	.607	.911	.215	.822			
	50	2.642	3.303	6.606	9.909	13.212	19.818			
	52½	.641	.302	.603	.905	.206	.810			
	55	.640	.300	.600	.901	.201	.801			
	56¼	.640	.300	.599	.899	.198	.797			
	57½	.639	.299	.598	.897	.195	.793			
30	00	2.638	3.297	6.595	9.892	13.190	19.785			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
30	00	2.638	3.297	6.595	9.892	13.190	19.785			
	02½	.637	.296	.592	.888	.184	.777			
	03¾	.636	.295	.591	.886	.182	.772			
	05	.636	.295	.589	.884	.179	.768			
	07½	.635	.293	.587	.880	.173	.760			
	10	2.633	3.292	6.584	9.876	13.168	19.752			
	11¼	.633	.291	.583	.874	.165	.748			
	12½	.632	.291	.581	.872	.162	.743			
	15	.631	.289	.578	.867	.157	.735			
	17½	.630	.288	.576	.863	.151	.727			
	18¾	.630	.287	.574	.861	.148	.723			
	20	2.629	3.286	6.573	9.859	13.146	19.719			
	22½	.628	.285	.570	.855	.140	.710			
	25	.627	.284	.567	.851	.135	.702			
	26¼	.626	.283	.566	.849	.132	.698			
	27½	.626	.282	.564	.847	.129	.693			
	30	2.625	3.281	6.562	9.843	13.123	19.685			
	32½	.623	.279	.559	.838	.118	.677			
	33¾	.623	.278	.557	.836	.115	.672			
	35	.622	.278	.556	.834	.112	.668			
	37½	.621	.277	.553	.830	.106	.660			
	40	2.620	3.275	6.550	9.826	13.101	19.651			
	41¼	.620	.275	.549	.824	.098	.647			
	42½	.619	.274	.548	.821	.095	.643			
	45	.618	.272	.545	.817	.090	.634			
	47½	.617	.271	.542	.813	.084	.626			
	48¾	.616	.270	.541	.811	.081	.622			
	50	2.616	3.270	6.539	9.809	13.078	19.618			
	52½	.615	.268	.536	.805	.073	.609			
	55	.613	.267	.534	.800	.067	.601			
	56¼	.613	.266	.532	.798	.064	.596			
	57½	.612	.265	.531	.796	.061	.592			
31	00	2.611	3.264	6.528	9.792	13.056	19.584			
	02½	.610	.263	.525	.788	.050	.575			
	03¾	.609	.262	.524	.785	.047	.571			
	05	.609	.261	.522	.783	.044	.566			
	07½	.608	.260	.519	.779	.039	.558			
	10	2.607	3.258	6.516	9.775	13.033	19.549			
	11¼	.606	.258	.515	.773	.030	.545			
	12½	.605	.257	.514	.770	.027	.541			
	15	.604	.255	.511	.766	.021	.532			
	17½	.603	.254	.508	.762	.016	.524			
	18¾	.603	.253	.506	.760	.013	.519			
	20	2.602	3.253	6.505	9.757	13.010	19.515			
	22½	.601	.251	.502	.753	.004	.506			
	25	.600	.250	.499	.749	12.999	.498			
	26¼	.599	.249	.498	.747	.996	.493			
	27½	.599	.248	.496	.745	.993	.489			
	30	2.597	3.247	6.494	9.740	12.987	19.481			
	32½	.596	.245	.491	.736	.981	.472			
	33¾	.596	.245	.489	.734	.978	.468			
	35	.595	.244	.488	.732	.976	.463			
	37½	.594	.242	.485	.727	.970	.455			
	40	2.593	3.241	6.482	9.723	12.964	19.446			
	41¼	.592	.240	.481	.721	.961	.442			
	42½	.592	.240	.479	.719	.958	.437			
	45	.591	.238	.476	.714	.952	.429			
	47½	.589	.237	.473	.710	.947	.420			
	48¾	.589	.236	.472	.708	.944	.416			
	50	2.588	3.235	6.470	9.706	12.941	19.411			
	52½	.587	.234	.467	.701	.935	.402			
	55	.586	.232	.465	.697	.929	.394			
	56¼	.585	.232	.463	.695	.926	.389			
	57½	.585	.231	.462	.693	.923	.385			
32	00	2.583	3.229	6.459	9.688	12.917	19.376			

For latitude 30°	1¼	3.788	0.000
	2½	7.577	.001
	3¾	11.365	.003
	5	15.153	.005
	6¼	18.942	.007
	7½	22.730	.011
	10	30.306	.019
	12½	37.884	.030
	15	45.460	.043
For latitude 31°	1¼	3.789	0.000
	2½	7.578	.001
	3¾	11.367	.003
	5	15.155	.005
	6¼	18.945	.008
	7½	22.733	.011
	10	30.311	.020
	12½	37.890	.031
	15	45.467	.044
For latitude 32°	1¼	3.789	0.000
	2½	7.579	.001
	3¾	11.369	.003
	5	15.158	.005
	6¼	18.948	.008
	7½	22.737	.011
	10	30.316	.020
	12½	37.896	.031
	15	45.474	.045

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel	Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
	Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
	1′	1¼′	2½′	3¾′	5′	7½′			
° ′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
32 00	2.583	3.229	6.459	9.688	12.917	19.376			
02½	.582	.228	.456	.684	.912	.367	1¼	3.789	0.000
03¾	.582	.227	.454	.681	.909	.363	2½	7.579	.001
05	.581	.226	.453	.679	.906	.359	3¾	11.369	.003
07½	.580	.225	.450	.675	.900	.351	5	15.158	.005
							For latitude 32° 6¼	18.948	.008
10	2.579	3.224	6.447	9.671	12.894	19.341	7½	22.737	.011
11¼	.578	.223	.445	.668	.891	.337	10	30.316	.020
12½	.578	.222	.444	.666	.888	.332	12½	37.896	.031
15	.576	.221	.441	.662	.882	.323	15	45.474	.045
17½	.575	.219	.438	.657	.876	.315			
18¾	.575	.218	.437	.655	.873	.310			
20	2.574	3.218	6.435	9.653	12.871	19.306	1¼	3.790	0.000
22½	.573	.216	.432	.649	.865	.297	2½	7.580	.001
25	.572	.215	.429	.644	.859	.288	3¾	11.370	.003
26¼	.571	.214	.428	.642	.856	.284	5	15.160	.005
27½	.571	.213	.426	.640	.853	.279	For latitude 33° 6¼	18.951	.008
							7½	22.741	.011
30	2.569	3.212	6.423	9.635	12.847	19.270	10	30.321	.020
32½	.568	.210	.420	.631	.841	.261	12½	37.902	.032
33¾	.568	.209	.419	.628	.838	.257	15	45.481	.046
35	.567	.209	.417	.626	.835	.252			
37½	.566	.207	.415	.622	.829	.244			
40	2.565	3.206	6.412	9.617	12.823	19.235	1¼	3.791	0.000
41¼	.564	.205	.410	.615	.820	.230	2½	7.581	.001
42½	.562	.204	.409	.613	.817	.226	3¾	11.372	.003
45	.562	.203	.406	.608	.811	.217	5	15.162	.005
47½	.561	.201	.403	.604	.805	.208	For latitude 34° 6¼	18.954	.008
48¾	.560	.201	.401	.602	.802	.203	7½	22.744	.011
							10	30.326	.021
50	2.560	3.200	6.400	9.599	12.799	19.199	12½	37.908	.032
52½	.559	.198	.397	.595	.793	.190	15	45.489	.046
55	.557	.197	.394	.590	.787	.181			
56¼	.557	.196	.392	.588	.784	.176			
57½	.556	.195	.391	.586	.781	.172			
33 00	2.555	3.194	6.388	9.581	12.775	19.163			
02½	.554	.192	.385	.577	.769	.154			
03¾	.553	.192	.383	.575	.766	.149			
05	.553	.191	.382	.572	.763	.145			
07½	.551	.189	.379	.568	.757	.136			
10	2.550	3.188	6.376	9.563	12.751	19.127			
11¼	.550	.187	.374	.561	.748	.122			
12½	.549	.186	.373	.559	.745	.118			
15	.548	.185	.370	.554	.739	.109			
17½	.547	.183	.367	.550	.733	.100			
18¾	.546	.183	.365	.548	.730	.095			
20	2.545	3.182	6.364	9.545	12.727	19.091			
22½	.544	.180	.360	.541	.721	.081			
25	.543	.179	.357	.536	.715	.072			
26¼	.542	.178	.356	.534	.712	.068			
27½	.542	.177	.354	.532	.709	.063			
30	2.540	3.176	6.351	9.527	12.703	19.054			
32½	.539	.174	.348	.523	.697	.045			
33¾	.539	.173	.347	.520	.694	.040			
35	.538	.173	.345	.518	.691	.036			
37½	.537	.171	.342	.513	.684	.027			
40	2.536	3.170	6.339	9.509	12.678	19.017			
41¼	.535	.169	.338	.506	.675	.013			
42½	.535	.168	.336	.504	.672	.008			
45	.533	.167	.333	.500	.666	18.999			
47½	.532	.165	.330	.495	.660	.990			
48¾	.531	.164	.328	.493	.657	.985			
50	2.531	3.163	6.327	9.490	12.654	18.981			
52½	.530	.162	.324	.486	.648	.972			
55	.528	.160	.321	.481	.642	.962			
56¼	.528	.160	.319	.479	.638	.958			
57½	.527	.159	.318	.477	.635	.953			
34 00	2.526	3.157	6.315	9.472	12.629	18.944			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel — Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
34	00	2.526	3.157	6.315	9.472	12.629	18.944
	02½	.525	.156	.312	.467	.623	.935
	03¾	.524	.155	.310	.465	.620	.930
	05	.523	.154	.308	.463	.617	.925
	07½	.522	.153	.305	.458	.611	.916
	10	2.521	3.151	6.302	9.453	12.605	18.907
	11¼	.520	.150	.301	.451	.601	.902
	12½	.520	.150	.299	.449	.598	.898
	15	.519	.148	.296	.444	.592	.888
	17½	.517	.146	.293	.439	.586	.879
	18¾	.517	.146	.291	.437	.583	.874
	20	2.516	3.145	6.290	9.435	12.580	18.870
	22½	.515	.143	.287	.430	.574	.860
	25	.513	.142	.284	.425	.567	.851
	26¼	.513	.141	.282	.423	.564	.846
	27½	.512	.140	.281	.421	.561	.842
	30	2.511	3.139	6.277	9.416	12.555	18.832
	32½	.510	.137	.274	.411	.549	.823
	33¾	.509	.136	.273	.409	.545	.818
	35	.508	.136	.271	.407	.542	.814
	37½	.507	.134	.268	.402	.536	.804
	40	2.506	3.132	6.265	9.397	12.530	18.795
	41¼	.505	.132	.263	.395	.527	.790
	42½	.505	.131	.262	.393	.523	.785
	45	.503	.129	.259	.388	.517	.776
	47½	.502	.128	.255	.383	.511	.766
	48¾	.502	.127	.254	.381	.508	.762
	50	2.501	3.126	6.252	9.378	12.505	18.757
	52½	.500	.125	.249	.374	.498	.747
	55	.498	.123	.246	.369	.492	.738
	56¼	.498	.122	.244	.367	.489	.733
	57½	.497	.121	.243	.364	.486	.728
35	00	2.496	3.120	6.240	9.359	12.479	18.719
	02½	.495	.118	.237	.355	.473	.710
	03¾	.494	.117	.235	.352	.470	.705
	05	.493	.117	.233	.350	.467	.700
	07½	.492	.115	.230	.345	.460	.691
	10	2.491	3.113	6.227	9.341	12.454	18.681
	11¼	.490	.113	.225	.338	.451	.676
	12½	.490	.112	.224	.336	.448	.672
	15	.488	.110	.221	.331	.441	.662
	17½	.487	.109	.217	.326	.435	.652
	18¾	.486	.108	.216	.324	.432	.648
	20	2.486	3.107	6.214	9.321	12.428	18.643
	22½	.484	.106	.211	317	.422	.633
	25	.483	.104	.208	.312	.416	.624
	26¼	.482	.103	.206	.309	.413	.619
	27½	.482	.102	.205	.307	.409	.614
	30	2.481	3.101	6.202	9.302	12.403	18.605
	32½	.479	.099	.198	.297	.397	.595
	33¾	.479	.098	.197	.295	.393	.590
	35	.478	.098	.195	.293	.390	.585
	37½	.477	.096	.192	.288	.384	.576
	40	2.476	3.094	6.189	9.283	12.377	18.566
	41¼	.475	.093	.187	.281	.374	.561
	42½	.474	.093	.185	.278	.371	.556
	45	.473	.091	.182	.273	.364	.547
	47½	.472	.089	.179	.268	.358	.537
	48¾	.471	.089	.177	.266	.355	.532
	50	2.470	3.088	6.176	9.264	12.352	18.527
	52½	.469	.086	.172	.259	.345	.518
	55	.468	.085	.169	.254	.339	.508
	56¼	.467	.084	.168	.252	.335	.503
	57½	.466	.083	.166	.249	.332	.498
36	00	2.465	3.081	6.163	9.244	12.326	18.488

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 34°	1¼	3.791	0.000
	2½	7.581	.001
	3¾	11.372	.003
	5	15.162	.005
	6¼	18.954	.008
	7½	22.744	.011
	10	30.326	.021
	12½	37.908	.032
	15	45.489	.046
For latitude 35°	1¼	3.791	0.000
	2½	7.583	.001
	3¾	11.374	.003
	5	15.165	.005
	6¼	18.957	.008
	7½	22.748	.012
	10	30.331	.021
	12½	37.914	.033
	15	45.496	.047
For latitude 36°	1¼	3.792	0.000
	2½	7.584	.001
	3¾	11.376	.003
	5	15.168	.005
	6¼	18.960	.008
	7½	22.752	.012
	10	30.336	.021
	12½	37.921	.033
	15	45.504	.047

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel					
		Longitude interval					
		1′	1¼′	2½′	3¾′	5′	7½′
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*
36	00	2.465	3.081	6.163	9.244	12.326	18.488
	02½	.464	.080	.160	.239	.319	.479
	03¾	.463	.079	.158	.237	.316	.474
	05	.463	.078	.156	.234	.313	.469
	07½	.461	.077	.153	.230	.306	.459
	10	2.460	3.075	6.150	9.225	12.300	18.450
	11¼	.459	.074	.148	.222	.296	.445
	12½	.459	.073	.147	.220	.293	.440
	15	.457	.072	.143	.215	.287	.430
	17½	.456	.070	.140	.210	.280	.420
	18¾	.455	.069	.138	.208	.277	.415
	20	2.455	3.068	6.137	9.205	12.274	18.410
	22½	.453	.067	.134	.200	.267	.401
	25	.452	.065	.130	.195	.260	.391
	26¼	.451	.064	.129	.193	.257	.386
	27½	.451	.063	.127	.190	.254	.381
	30	2.449	3.062	6.124	9.186	12.247	18.371
	32½	.448	.060	.120	.181	.241	.361
	33¾	.447	.059	.119	.178	.238	.356
	35	.447	.059	.117	.176	.234	.351
	37½	.446	.057	.114	.171	.228	.342
	40	2.444	3.055	6.111	9.166	12.221	18.332
	41¼	.444	.054	.109	.163	.218	.327
	42½	.443	.054	.107	.161	.215	.322
	45	.442	.052	.104	.156	.208	.312
	47½	.440	.050	.101	.151	.201	.302
	48¾	.440	.050	.099	.149	.198	.297
	50	2.439	3.049	6.097	9.146	12.195	18.292
	52½	.438	.047	.094	.141	.188	.282
	55	.436	.045	.091	.136	.181	.272
	56¼	.436	.045	.089	.134	.178	.267
	57½	.435	.044	.087	.131	.175	.262
37	00	2.434	3.042	6.084	9.126	12.168	18.252
	02½	.432	.040	.081	.121	.162	.242
	03¾	.432	.040	.079	.119	.158	.237
	05	.431	.039	.077	.116	.155	.232
	07½	.430	.037	.074	.111	.148	.222
	10	2.428	3.035	6.071	9.106	12.142	18.212
	11¼	.428	.035	.069	.104	.138	.207
	12½	.427	.034	.067	.101	.135	.102
	15	.426	.032	.064	.096	.128	.192
	17½	.424	.030	.061	.091	.121	.182
	18¾	.424	.030	.059	.089	.118	.177
	20	2.423	3.029	6.057	9.086	12.115	18.172
	22½	.422	.027	.054	.081	.108	.162
	25	.420	.025	.051	.076	.101	.152
	26¼	.420	.025	.049	.074	.098	.147
	27½	.419	.024	.047	.071	.095	.142
	30	2.418	3.022	6.044	9.066	12.088	18.132
	32½	.416	.020	.041	.061	.081	.122
	33¾	.416	.020	.039	.059	.078	.117
	35	.415	.019	.037	.056	.075	.112
	37½	.414	.017	.034	.051	.068	.102
	40	2.412	3.015	6.031	9.046	12.061	18.092
	41¼	.412	.014	.029	.043	.058	.087
	42½	.411	.014	.027	.041	.054	.082
	45	.410	.012	.024	.036	.048	.071
	47½	.408	.010	.020	.031	.041	.061
	48¾	.407	.009	.019	.028	.038	.056
	50	2.407	3.009	6.017	9.026	12.034	18.051
	52½	.405	.007	.014	.021	.027	.041
	55	.404	.005	.010	.015	.021	.031
	56¼	.403	.004	.009	.013	.017	.026
	57½	.403	.003	.007	.010	.014	.021
38	00	2.401	3.002	6.004	9.005	12.007	18.011

Ordinates of developed parallel and meridional distances			
Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
	′	*Inches*	*Inch*
For latitude 36°	1¼	3.792	0.000
	2½	7.584	.001
	3¾	11.376	.003
	5	15.168	.005
	6¼	18.960	.008
	7½	22.752	.012
	10	30.336	.021
	12½	37.921	.033
	15	45.504	.047
For latitude 37°	1¼	3.793	0.000
	2½	7.585	.001
	3¾	11.378	.003
	5	15.170	.005
	6¼	18.964	.008
	7½	22.756	.012
	10	30.341	.021
	12½	37.927	.033
	15	45.512	.048
For latitude 38°	1¼	3.793	0.000
	2½	7.587	.001
	3¾	11.380	.003
	5	15.173	.005
	6¼	18.967	.008
	7½	22.760	.012
	10	30.346	.021
	12½	37.935	.034
	15	45.520	.048

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
38	00	2.401	3.002	6.004	9.005	12.007	18.011			
	02½	.400	.000	.000	.000	.000	.000	1¼	3.793	0.000
	03¾	.399	2.999	5.998	8.998	11.997	17.995	2½	7.587	.001
	05	.399	.998	.997	.995	.993	.990	3¾	11.380	.003
	07½	.397	.997	.993	.990	.987	.980	5	15.173	.005
								For latitude 38° 6¼	18.967	.008
	10	2.396	2.995	5.990	8.985	11.980	17.970	7½	22.760	.012
	11¼	.395	.994	.988	.982	.976	.965	10	30.346	.021
	12½	.395	.993	.986	.980	.973	.959	12½	37.935	.034
	15	.393	.992	.983	.975	.966	.949	15	45.520	.048
	17½	.392	.990	.980	.969	.959	.939			
	18¾	.391	.989	.978	.967	.956	.934			
								1¼	3.794	0.000
	20	2.391	2.988	5.976	8.964	11.952	17.929	2½	7.588	.001
	22½	.389	.986	.973	.959	.946	.918	3¾	11.382	.003
	25	.388	.985	.969	.954	.939	.908	5	15.176	.005
	26¼	.387	.984	.968	.951	.935	.903	For latitude 39° 6¼	18.970	.008
	27½	.386	.983	.966	.949	.932	.898	7½	22.764	.012
								10	30.352	.022
	30	2.385	2.981	5.963	8.944	11.925	17.888	12½	37.940	.034
	32½	.384	.980	.959	.939	.918	.877	15	45.527	.049
	33¾	.383	.979	.957	.936	.915	.872			
	35	.382	.978	.956	.933	.911	.867			
	37½	.381	.976	.952	.928	.904	.857			
								1¼	3.795	0.000
	40	2.380	2.974	5.949	8.923	11.897	17.846	2½	7.589	.001
	41¼	.379	.974	.947	.921	.894	.841	3¾	11.384	.003
	42½	.378	.973	.945	.918	.891	.836	5	15.178	.005
	45	.377	.971	.942	.913	.884	.826	For latitude 40° 6¼	18.973	.009
	47½	.375	.969	.938	.908	.877	.815	7½	22.768	.012
	48¾	.375	.968	.937	.905	.873	.810	10	30.357	.022
								12½	37.947	.034
	50	2.374	2.967	5.935	8.902	11.870	17.805	15	45.536	.049
	52½	.373	.966	.931	.897	.863	.794			
	55	.371	.964	.928	.892	.856	.784			
	56¼	.370	.963	.926	.889	.852	.779			
	57½	.370	.962	.924	.887	.849	.774			
39	00	2.368	2.961	5.921	8.882	11.842	17.763			
	02½	.367	.959	.918	.876	.835	.753			
	03¾	.366	.958	.916	.874	.832	.748			
	05	.366	.957	.914	.871	.828	.742			
	07½	.364	.955	.911	.866	.821	.732			
	10	2.363	2.954	5.907	8.861	11.814	17.721			
	11¼	.362	.953	.905	.858	.811	.716			
	12½	.361	.952	.904	.856	.807	.711			
	15	.360	.950	.900	.850	.800	.701			
	17½	.359	.948	.897	.845	.793	.690			
	18¾	.358	.947	.895	.842	.790	.685			
	20	2.357	2.947	5.893	8.840	11.786	17.680			
	22½	.356	.945	.890	.835	.779	.669			
	25	.354	.943	.886	.829	.772	.658			
	26¼	.354	.942	.884	.827	.769	.653			
	27½	.353	.941	.883	.824	.765	.648			
	30	2.352	2.940	5.879	8.819	11.758	17.638			
	32½	.350	.938	.876	.813	.751	.627			
	33¾	.350	.937	.874	.811	.748	.622			
	35	.349	.936	.872	.808	.744	.616			
	37½	.347	.934	.869	.803	.737	.606			
	40	2.346	2.933	5.865	8.798	11.730	17.595			
	41¼	.345	.932	.863	.795	.727	.590			
	42½	.345	.931	.862	.792	.723	.585			
	45	.343	.929	.858	.787	.716	.574			
	47½	.342	.927	.855	.782	.709	.564			
	48¾	.341	.926	.853	.779	.705	.558			
	50	2.340	2.925	5.851	8.776	11.702	17.553			
	52½	.339	.924	.847	.777	.695	.542			
	55	.338	.922	.844	.766	.688	.532			
	56¼	.337	.921	.842	.763	.684	.526			
	57½	.336	.920	.840	.761	.681	.521			
40	00	2.335	2.918	5.837	8.755	11.674	17.510			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
40	00	2.335	2.918	5.837	8.755	11.674	17.510			
	02½	.333	.917	.833	.750	.667	.500	1¼	3.795	0.000
	03¾	.333	.916	.831	.747	.663	.494	2½	7.589	.001
	05	.332	.915	.830	.745	.659	.489	3¾	11.384	.003
	07½	.330	.913	.826	.739	.652	.479	5	15.178	.005
								6¼	18.973	.009
	10	2.329	2.911	5.823	8.734	11.645	17.468	7½	22.768	.012
	11¼	.328	.910	.821	.731	.642	.462	10	30.357	.022
	12½	.328	.910	.819	.729	.638	.457	12½	37.947	.034
	15	.326	.908	.815	.723	.631	.446	15	45.536	.049
	17½	.325	.906	.812	.718	.624	.436			
	18¾	.324	.905	.810	.715	.620	.430			
	20	2.323	2.904	5.808	8.712	11.617	17.425			
	21½	.322	.902	.805	.707	.610	.414	1¼	3.795	0.000
	25	.321	.901	.801	.702	.602	.404	2½	7.590	.001
	26¼	.320	.900	.799	.699	.599	.398	3¾	11.386	.003
	27½	.319	.899	.798	.696	.595	.393	5	15.181	.005
								6¼	18.977	.009
	30	2.318	2.897	5.794	8.691	11.588	17.382	7½	22.772	.012
	32½	.316	.895	.790	.686	.581	.371	10	30.362	.022
	33¾	.315	.894	.789	.683	.577	.366	12½	37.953	.034
	35	.315	.893	.787	.680	.574	.361	15	45.544	.049
	37½	.313	.892	.783	.675	.567	.350			
								1¼	3.796	0.000
	40	2.312	2.890	5.780	8.670	11.559	17.339	2½	7.592	.001
	41¼	.311	.889	.778	.667	.556	.334	3¾	11.388	.003
	42½	.310	.888	.776	.664	.552	.328	5	15.184	.006
	45	.309	.886	.772	.659	.545	.317	6¼	18.980	.009
	47½	.308	.884	.769	.653	.538	.306	7½	22.776	.012
	48¾	.307	.884	.767	.651	.534	.301	10	30.367	.022
								12½	37.960	.034
	50	2.306	2.883	5.765	8.648	11.531	17.296	15	45.551	.050
	52½	.305	.881	.762	.642	.523	.285			
	55	.303	.879	.758	.637	.516	.274			
	56¼	.303	.878	.756	.634	.512	.269			
	57½	.302	.877	.754	.632	.509	.263			
41	00	2.300	2.875	5.751	8.626	11.502	17.252			
	02½	.299	.874	.747	.621	.494	.241			
	03¾	.298	.873	.745	.618	.491	.236			
	05	.297	.872	.744	.615	.487	.231			
	07½	.296	.870	.740	.610	.480	.220			
	10	2.295	2.868	5.736	8.604	11.473	17.209			
	11¼	.294	.867	.734	.602	.469	.203			
	12½	.293	.866	.733	.599	.465	.198			
	15	.292	.864	.729	.594	.458	.187			
	17½	.290	.863	.725	.588	.451	.176			
	18¾	.289	.862	.724	.585	.447	.171			
	20	2.289	2.862	5.722	8.583	11.443	17.165			
	22½	.287	.859	.718	.577	.436	.154			
	25	.286	.857	.714	.572	.429	.143			
	26¼	.285	.856	.713	.569	.425	.138			
	27½	.284	.855	.711	.566	.422	.132			
	30	2.283	2.854	5.707	8.561	11.414	17.121			
	32½	.281	.852	.703	.555	.407	.110			
	33¾	.281	.851	.702	.552	.403	.105			
	35	.280	.850	.700	.550	.400	.099			
	37½	.279	.848	.696	.544	.392	.088			
	40	2.277	2.846	5.692	8.539	11.385	17.077			
	41¼	.276	.845	.691	.536	.381	.072			
	42½	.276	.844	.689	.533	.378	.066			
	45	.274	.843	.685	.528	.370	.055			
	47½	.273	.841	.681	.522	.363	.044			
	48¾	.272	.840	.680	.519	.359	.039			
	50	2.271	2.839	5.678	8.517	11.356	17.033			
	52½	.270	.837	.674	.511	.348	.022			
	55	.268	.835	.670	.506	.341	.011			
	56¼	.267	.834	.669	.503	.337	.006			
	57½	.267	.833	.667	.500	.333	.000			
42	00	2.265	2.831	5.663	8.494	11.326	16.989			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances			
		Longitude interval						Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5	7½′				
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*		′	*Inches*	*Inch*
42	00	2.265	2.831	5.663	8.494	11.326	16.989	For latitude 42°	1¼	3.796	0.000
	02½	.264	.830	.659	.489	.319	.978		2½	7.592	.001
	03¾	.263	.829	.657	.486	.315	.972		3¾	11.388	.003
	05	.262	.828	.656	.483	.311	.967		5	15.184	.006
	07½	.261	.826	.652	.478	.304	.956		6¼	18.980	.009
									7½	22.776	.012
	10	2.259	2.824	5.648	8.472	11.296	16.945		10	30.367	.022
	11¼	.259	.823	.646	.470	.293	.939		12½	37.960	.034
	12½	.258	.822	.644	.467	.289	.933		15	45.551	.050
	15	.256	.820	.641	.462	.282	.922				
	17½	.255	.819	.637	.456	.274	.911				
	18¾	.254	.818	.635	.453	.270	.906				
	20	2.253	2.817	5.633	8.450	11.267	16.900	For latitude 43°	1¼	3.797	0.000
	22½	.252	.815	.630	.444	.259	.889		2½	7.593	.001
	25	.250	.813	.626	.439	.252	.878		3¾	11.390	.003
	26¼	.250	.812	.624	.436	.248	.872		5	15.186	.006
	27½	.249	.811	.622	.433	.244	.867		6¼	18.983	.009
									7½	22.780	.012
	30	2.247	2.809	5.618	8.428	11.237	16.855		10	30.373	.022
	32½	.246	.807	.615	.422	.229	.844		12½	37.967	.035
	33¾	.245	.807	.613	.419	.226	.839		15	45.560	.050
	35	.244	.805	.611	.416	.222	.833				
	37½	.243	.804	.607	.411	.215	.822				
	40	2.241	2.802	5.604	8.405	11.207	16.811	For latitude 44°	1¼	3.797	0.000
	41¼	.241	.801	.602	.402	.203	.805		2½	7.594	.001
	42½	.240	.800	.600	.400	.200	.799		3¾	11.392	.003
	45	.238	.798	.596	.394	.192	.788		5	15.189	.006
	47½	.237	.796	.592	.388	.184	.777		6¼	18.987	.009
	48¾	.236	.795	.590	.386	.181	.771		7½	22.784	.012
									10	30.378	.022
	50	2.235	2.794	5.589	8.383	11.177	16.766		12½	37.974	.035
	52½	.234	.792	.585	.377	.169	.754		15	45.568	.050
	55	.232	.790	.581	.371	.162	.743				
	56¼	.232	.790	.579	.369	.158	.737				
	57½	.231	.789	.577	.366	.154	.732				
43	00	2.229	2.787	5.574	8.360	11.147	16.721				
	02½	.228	.785	.570	.355	.139	.709				
	03¾	.227	.784	.568	.352	.136	.704				
	05	.226	.783	.566	.349	.132	.698				
	07½	.225	.781	.562	.343	.124	.687				
	10	2.223	2.779	5.558	8.338	11.117	16.675				
	11¼	.223	.778	.557	.335	.113	.670				
	12½	.222	.777	.555	.332	.109	.664				
	15	.220	.775	.551	.326	.102	652				
	17½	.219	.774	.547	.321	.094	.641				
	18¾	.218	.773	.545	.318	.090	.635				
	20	2.217	2.772	5.543	8.315	11.086	16.630				
	22½	.216	.770	.539	.309	.079	.618				
	25	.214	.768	.536	.304	.071	.607				
	26¼	.213	.767	.534	.301	.068	.601				
	27½	.213	.766	.532	.298	.064	.596				
	30	2.211	2.764	5.528	8.292	11.056	16.584				
	32½	.210	.762	.524	.286	.049	.573				
	33¾	.209	.761	.522	.284	.045	.567				
	35	.208	.760	.520	.281	.041	.561				
	37½	.207	.758	.517	.275	.033	.550				
	40	2.205	2.756	5.513	8.269	11.026	16.538				
	41¼	.204	.755	.511	.266	.022	.533				
	42½	.204	.754	.509	.263	.018	.527				
	45	.202	.753	.505	.258	.010	.516				
	47½	.201	.751	.501	.252	.003	.504				
	48¾	.200	.750	.499	.249	10.999	.498				
	50	2.199	2.749	5.498	8.246	10.995	16.493				
	52½	.197	.747	.494	.241	.987	.481				
	55	.196	.745	.490	.235	.980	.470				
	56¼	.195	.744	.488	.232	.976	.464				
	57½	.194	.743	.486	.229	.972	.458				
44	00	2.193	2.741	5.482	8.223	10.964	16.447				

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*		*Inches*	*Inch*
44	00	2.193	2.741	5.482	8.223	10.964	16.447			
	02½	.191	.739	.478	.218	.957	.435			
	03¾	.191	.738	.476	.215	.953	.429			
	05	.190	.737	.475	.212	.949	.424			
	07½	.188	.735	.471	.206	.941	.412			
	10	2.187	2.733	5.467	8.200	10.934	16.401			
	11¼	.186	.732	.465	.197	.930	.395			
	12½	.185	.732	.463	.195	.926	.389			
	15	.184	.730	.459	.189	.918	.376			
	17½	.182	.728	.455	.183	.911	.366			
	18¾	.181	.727	.453	.180	.907	.360			
	20	2.181	2.726	5.451	8.177	10.903	16.354			
	22½	.179	.724	.448	.171	.895	.343			
	25	.177	.722	.444	.166	.887	.331			
	26¼	.177	.721	.442	.163	.884	.325			
	27½	.176	.720	.440	.160	.880	.320			
	30	2.174	2.718	5.436	8.154	10.872	16.308			
	32½	.173	.716	.432	.148	.864	.296			
	33¾	.172	.715	.430	.145	.860	.291			
	35	.171	.714	.428	.142	.856	.285			
	37½	.170	.712	.424	.137	.849	.273			
	40	2.168	2.710	5.420	8.131	10.841	16.261			
	41¼	.167	.709	.419	.128	.837	.256			
	42½	.167	.708	.417	.125	.833	.250			
	45	.165	.706	.413	.119	.825	.238			
	47½	.164	.704	.409	.113	.818	.227			
	48¾	.163	.703	.407	.110	.814	.221			
	50	2.162	2.702	5.405	8.107	10.810	16.215			
	52½	.160	.701	.401	.102	.802	.203			
	55	.159	.699	.397	.096	.794	.191			
	56¼	.158	.698	.395	.093	.790	.186			
	57½	.157	.697	.393	.090	.787	.180			
45	00	2.156	2.695	5.389	8.084	10.779	16.168			
	02½	.154	.693	.385	.078	.770	.156			
	03¾	.153	.692	.383	.075	.767	.150			
	05	.153	.691	.381	.072	.763	.144			
	07½	.151	.689	.378	.066	.755	.133			
	10	2.149	2.687	5.374	8.061	10.747	16.121			
	11¼	.149	.686	.372	.058	.743	.115			
	12½	.148	.685	.370	.055	.740	.109			
	15	.146	.683	.366	.049	.732	.097			
	17½	.145	.681	.362	.043	.724	.086			
	18¾	.144	.680	.360	.040	.720	.080			
	20	2.143	2.679	5.358	8.037	10.716	16.074			
	22½	.142	.677	.354	.031	.708	.062			
	25	.140	.675	.350	.025	.700	.050			
	26¼	.139	.674	.348	.022	.696	.045			
	27½	.139	.673	.346	.019	.692	.039			
	30	2.137	2.671	5.342	8.013	10.685	16.027			
	32½	.135	.669	.338	.007	.677	.015			
	33¾	.134	.668	.336	.004	.673	.009			
	35	.134	.667	.334	.001	.669	.003			
	37½	.132	.665	.330	7.996	.661	15.991			
	40	2.131	2.663	5.326	7.990	10.653	15.979			
	41¼	.130	.662	.324	.987	.649	.973			
	42½	.129	.661	.323	.984	.645	.968			
	45	.127	.659	.319	.978	.637	.956			
	47½	.126	.657	.315	.972	.629	.944			
	48¾	.125	.656	.313	.969	.625	.938			
	50	2.124	2.655	5.311	7.966	10.621	15.932			
	52½	.123	.653	.307	.960	.613	.920			
	55	.121	.651	.303	.954	.605	.908			
	56¼	.120	.650	.301	.951	.601	.902			
	57½	.119	.649	.299	.948	.597	.896			
46	00	2.118	2.647	5.295	7.942	10.590	15.884			
								For latitude 44° 1¼′	3.797	0.000
								2½′	7.594	.001
								3¾′	11.392	.003
								5′	15.189	.006
								6¼′	18.987	.009
								7½′	22.784	.012
								10′	30.378	.022
								12½′	37.974	.035
								15′	45.568	.050
								For latitude 45° 1¼′	3.798	0.000
								2½′	7.596	.001
								3¾′	11.394	.003
								5′	15.192	.006
								6¼′	18.990	.009
								7½′	22.788	.012
								10′	30.384	.022
								12½′	37.980	.035
								15′	45.576	.050
								For latitude 46° 1¼′	3.799	0.000
								2½′	7.597	.001
								3¾′	11.396	.003
								5′	15.194	.006
								6¼′	18.994	.009
								7½′	22.792	.012
								10′	30.389	.022
								12½′	37.987	.035
								15′	45.584	.050

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances			
		Longitude interval						Latitude and longitude intervals		Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′				
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*		′	*Inches*	*Inch*
46	00	2.118	2.647	5.295	7.942	10.590	15.884				
	02½	.116	.645	.291	.936	.582	.872				
	03¾	.116	.644	.289	.933	.578	.867				
	05	.115	.643	.287	.930	.574	.861				
	07½	.113	.641	.283	.924	.566	.849	For latitude 46°	1¼	3.799	0.000
									2½	7.597	.001
	10	2.112	2.639	5.279	7.918	10.558	15.837		3¾	11.396	.003
	11¼	.111	.638	.277	.915	.554	.831		5	15.194	.006
	12½	.110	.637	.275	.912	.550	.825		6¼	18.994	.009
	15	.108	.635	.271	.906	.542	.813		7½	22.792	.012
	17½	.107	.633	.267	.900	.534	.801		10	30.389	.022
	18¾	.106	.632	.265	.897	.530	.795		12½	37.987	.035
									15	45.584	.050
	20	2.105	2.631	5.263	7.894	10.526	15.789				
	22½	.104	.629	.259	.888	.518	.777				
	25	.102	.627	.255	.882	.510	.765				
	26¼	.101	.626	.253	.879	.506	.759				
	27½	.100	.625	.251	.876	.502	.753				
									1¼	3.799	0.000
	30	2.099	2.623	5.247	7.870	10.494	15.741		2½	7.599	.001
	32½	.097	.621	.243	.864	.486	.729		3¾	11.398	.003
	33¾	.096	.620	.241	.861	.482	.723		5	15.197	.006
	35	.096	.619	.239	.858	.478	.717	For latitude 47°	6¼	18.997	.009
	37½	.094	.617	.235	.852	.470	.705		7½	22.796	.012
									10	30.394	.022
	40	2.092	2.615	5.231	7.846	10.462	15.692		12½	37.994	.035
	41¼	.092	.614	.229	.843	.458	.686		15	45.592	.050
	42½	.091	.613	.227	.840	.454	.680				
	45	.089	.611	.223	.834	.446	.668				
	47½	.087	.609	.219	.828	.438	.656				
	48¾	.087	.608	.217	.825	.434	.650				
									1¼	3.800	0.000
	50	2.086	2.607	5.215	7.822	10.429	15.644		2½	7.600	.001
	52½	.084	.605	.211	.816	.421	.632		3¾	11.400	.003
	55	.083	.603	.207	.810	.413	.620		5	15.200	.006
	56¼	.082	.602	.205	.807	.409	.614	For latitude 48°	6¼	19.000	.009
	57½	.081	.601	.203	.804	.405	.608		7½	22.800	.012
									10	30.400	.021
47	00	2.079	2.599	5.199	7.798	10.397	15.596		12½	38.001	.035
	02½	.078	.597	.195	.792	.389	.584		15	45.600	.050
	03¾	.077	.596	.192	.789	.385	.577				
	05	.076	.595	.190	.786	.381	.571				
	07½	.075	.593	.186	.780	.373	.559				
	10	2.073	2.591	5.182	7.774	10.365	15.547				
	11¼	.072	.590	.180	.771	.361	.541				
	12½	.071	.589	.178	.768	.357	.535				
	15	.070	.587	.174	.763	.349	.523				
	17½	.068	.585	.170	.755	.341	.511				
	18¾	.067	.584	.168	.752	.336	.505				
	20	2.066	2.583	5.166	7.749	10.332	15.499				
	22½	.065	.581	.162	.743	.324	.486				
	25	.063	.579	.158	.737	.316	.474				
	26¼	.062	.578	.156	.734	.312	.468				
	27½	.062	.577	.154	.731	.308	.462				
	30	2.060	2.575	5.150	7.725	10.300	15.450				
	32½	.058	.573	.146	.719	.292	.437				
	33¾	.058	.572	.144	.716	.288	.431				
	35	.057	.571	.142	.713	.284	.425				
	37½	.055	.569	.138	.706	.275	.413				
	40	2.053	2.566	5.134	7.700	10.267	15.401				
	41¼	.053	.566	.131	.697	.263	.394				
	42½	.052	.565	.129	.694	.259	.388				
	45	.050	.563	.125	.688	.251	.376				
	47½	.049	.561	.121	.682	.243	.364				
	48¾	.048	.560	.119	.679	.239	.358				
	50	2.047	2.559	5.117	7.676	10.234	15.352				
	52½	.045	.557	.113	.670	.226	.339				
	55	.044	.555	.109	.664	.218	.327				
	56¼	.043	.553	.107	.660	.214	.321				
	57½	.042	.552	.105	.657	.210	.315				
48	00	2.040	2.550	5.101	7.651	10.202	15.302				

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{2\,500\,000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
48	00	2.040	2.550	5.101	7.651	10.202	15.302			
	02½	.039	.548	.097	.645	.193	.290	1¼	3.800	0.000
	03¾	.038	.547	.095	.642	.189	.284	2½	7.600	.001
	05	.037	.546	.093	.639	.185	.278	3¾	11.400	.003
	07½	.035	.544	.088	.633	.177	.265	5	15.200	.005
								For latitude 48° 6¼	19.000	.009
								7½	22.800	.012
	10	2.034	2.542	5.084	7.626	10.169	15.253	10	30.400	.022
	11¼	.033	.541	.082	.623	.165	.247	12½	38.001	.034
	12½	.032	.540	.080	.620	.160	.241	15	45.600	.050
	15	.030	.538	.076	.614	.152	.228			
	17½	.029	.536	.072	.608	.144	.216			
	18¾	.028	.535	.070	.605	.140	.210			
								1¼	3.801	0.000
	20	2.027	2.534	5.068	7.602	10.136	15.204	2½	7.601	.001
	22½	.025	.532	.064	.596	.127	.191	3¾	11.402	.003
	25	.024	.530	.060	.589	.119	.179	5	15.202	.005
	26¼	.023	.529	.058	.586	.115	.173	For latitude 49° 6¼	19.004	.009
	27½	.022	.528	.055	.583	.111	.166	7½	22.804	.012
								10	30.405	.022
	30	2.020	2.526	5.051	7.577	10.103	15.154	12½	38.007	.034
	32½	.019	.524	.047	.571	.094	.142	15	45.608	.049
	33¾	.018	.523	.045	.568	.090	.135			
	35	.017	.521	.043	.564	.086	.129			
	37½	.016	.519	.039	.558	.078	.117			
								1¼	3.801	0.000
	40	2.014	2.517	5.035	7.552	10.069	15.104	2½	7.603	.001
	41¼	.013	.516	.033	.549	.065	.098	3¾	11.404	.003
	42½	.012	.515	.031	.546	.061	.092	5	15.205	.005
	45	.011	.513	.027	.540	.053	.079	For latitude 50° 6¼	19.007	.009
	47½	.009	.511	.022	.533	.045	.067	7½	22.808	.012
	48¾	.008	.510	.020	.530	.040	.061	10	30.411	.022
								12½	38.014	.034
	50	2.007	2.509	5.018	7.527	10.036	15.054	15	45.617	.049
	52½	.006	.507	.014	.521	.028	.042			
	55	.004	.505	.010	.515	.020	.029			
	56¼	.003	.504	.008	.512	.015	.023			
	57½	.002	.503	.006	.508	.011	.017			
49	00	2.001	2.501	5.001	7.502	10.003	15.004			
	02½	1.999	.499	4.997	.496	9.995	14.992			
	03¾	.998	.498	.995	.493	.990	.986			
	05	.997	.497	.993	.490	.986	.979			
	07½	.996	.494	.989	.483	.978	.967			
	10	1.994	2.492	4.985	7.477	9.970	14.954			
	11¼	.993	.491	.983	.474	.965	.948			
	12½	.992	.490	.981	.471	.961	.942			
	15	.991	.488	.976	.465	.953	.929			
	17½	.989	.486	.972	.458	.944	.917			
	18¾	.988	.485	.970	.455	.940	.910			
	20	1.987	2.484	4.968	7.452	9.936	14.904			
	22½	.986	.482	.964	.446	.928	.891			
	25	.984	.480	.960	.439	.919	.879			
	26¼	.983	.479	.957	.436	.915	.872			
	27½	.982	.478	.955	.433	.911	.866			
	30	1.980	2.476	4.951	7.427	9.902	14.854			
	32½	.979	.473	.947	.420	.894	.841			
	33¾	.978	.472	.945	.417	.890	.835			
	35	.977	.471	.943	.414	.886	.828			
	37½	.975	.469	.939	.408	.877	.816			
	40	1.974	2.467	4.934	7.401	9.869	14.803			
	41¼	.973	.466	.932	.398	.864	.797			
	42½	.972	.465	.930	.395	.860	.790			
	45	.970	.463	.926	.389	.852	.778			
	47½	.969	.461	.922	.383	.843	.765			
	48¾	.968	.460	.920	.379	.839	.759			
	50	1.967	2.459	4.918	7.376	9.835	14.753			
	52½	.965	.457	.913	.370	.826	.740			
	55	.964	.454	.909	.363	.818	.727			
	56¼	.963	.453	.907	.360	.814	.721			
	57½	.962	.452	.905	.357	.810	.714			
50	00	1.960	2.450	4.901	7.351	9.801	14.702			

TABLE 4.—*Coordinates for the projection of maps, scale* $\frac{1}{24000}$—Continued

Latitude of parallel		Abscissas of developed parallel						Ordinates of developed parallel and meridional distances		
		Longitude interval						Latitude and longitude intervals	Meridional distance	Ordinate of developed parallel
		1′	1¼′	2½′	3¾′	5′	7½′			
°	′	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	*Inches*	′	*Inches*	*Inch*
50	00	1.960	2.450	4.901	7.351	9.801	14.702			
	02½	.959	.448	.896	.344	.793	.689	1¼	3.801	0.000
	03¾	.958	.447	.894	.341	.788	.683	2½	7.603	.001
	05	.957	.446	.892	.338	.784	.676	3¾	11.404	.003
	07½	.955	.444	.888	.332	.776	.664	5	15.205	.005
								For latitude 50° 6¼	19.007	.009
	10	1.953	2.442	4.884	7.325	9.767	14.651	7½	22.808	.012
	11¼	.953	.441	.882	.322	.763	.645	10	30.411	.022
	12½	.952	.440	.879	.319	.759	.638	12½	38.014	.034
	15	.950	.438	.875	.313	.750	.625	15	45.617	.049
	17½	.948	.435	.871	.306	.742	.613			
	18¾	.948	.434	.869	.303	.737	.606			
	20	1.947	2.433	4.867	7.300	9.733	14.600	1¼	3.802	0.000
	22½	.945	.431	.862	.293	.725	.587	2½	7.604	.001
	25	.943	.429	.858	.287	.716	.574	3¾	11.406	.003
	26¼	.942	.428	.856	.284	.712	.568	5	15.208	.005
	27½	.942	.427	.854	.281	.708	.561	For latitude 51° 6¼	19.010	.008
								7½	22.812	.012
	30	1.940	2.425	4.850	7.274	9.699	14.549	10	30.416	.022
	32½	.938	.423	.845	.268	.691	.536	12½	38.021	.034
	33¾	.937	.422	.843	.265	.686	.529	15	45.625	.049
	35	.936	.420	.841	.261	.682	.523			
	37½	.935	.418	.837	.255	.674	.510			
	40	1.933	2.416	4.833	7.249	9.665	14.498			
	41¼	.932	.415	.830	.246	.661	.491			
	42½	.931	.414	.828	.242	.656	.485			
	45	.930	.412	.824	.236	.648	.472			
	47½	.928	.410	.820	.229	.639	.459			
	48¾	.927	.409	.818	.226	.635	.453			
	50	1.926	2.408	4.815	7.223	9.631	14.446			
	52½	.924	.406	.811	.217	.622	.433			
	55	.923	.403	.807	.210	.614	.420			
	56¼	.922	.402	.805	.207	.609	.414			
	57½	.921	.401	.802	.204	.605	.408			
51	00	1.919	2.399	4.798	7.197	9.596	14.395			
	02½	.918	.397	.794	.191	.588	.382			
	03¾	.917	.396	.792	.188	.583	.375			
	05	.916	.395	.790	.184	.579	.369			
	07½	.914	.393	.785	.178	.571	.356			
	10	1.912	2.390	4.781	7.171	9.562	14.343			
	11¼	.912	.389	.779	.168	.558	.336			
	12½	.911	.388	.777	.165	.553	.330			
	15	.909	.386	.772	.159	.545	.317			
	17½	.907	.384	.768	.152	.536	.304			
	18¾	.906	.383	.766	.149	.532	.298			
	20	1.906	2.382	4.764	7.146	9.528	14.291			
	22½	.904	.380	.759	.139	.519	.278			
	25	.902	.377	.755	.133	.510	.265			
	26¼	.901	.376	.753	.129	.506	.259			
	27½	.900	.375	.751	.126	.501	.252			
	30	1.899	2.373	4.746	7.120	9.493	14.239			
	32½	.897	.371	.742	.113	.484	.226			
	33¾	.896	.370	.740	.110	.480	.220			
	35	.895	.369	.738	.107	.476	.213			
	37½	.893	.367	.733	.100	.467	.200			
	40	1.892	2.364	4.729	7.094	9.458	14.187			
	41¼	.891	.363	.727	.090	.454	.181			
	42½	.890	.362	.725	.087	.450	.174			
	45	.888	.360	.720	.081	.441	.161			
	47½	.886	.358	.716	.074	.432	.148			
	48¾	.885	.357	.714	.071	.428	.142			
	50	1.885	2.356	4.712	7.068	9.424	14.135			
	52½	.883	.354	.707	.061	.415	.122			
	55	.881	.352	.703	.055	.406	.109			
	56¼	.880	.350	.701	.051	.402	.103			
	57½	.879	.349	.699	.048	.397	.096			
52	00	1.878	2.347	4.694	7.042	9.389	14.083			

TABLE 5.—*Coordinates of intersections of meridians and parallels and lengths of meridians for each degree of latitude, in meters*

[For modified polyconic projection of map of the world, natural scale]

Latitude (°)	Length of central meridian	Meridian 1° from central meridian			Meridian 2° from central meridian			Meridian 3° from central meridian		
		Length of meridian	X (for lower latitude)	Y (for lower latitude)	Length of meridian	X (for lower latitude)	Y (for lower latitude)	Length of meridian	X (for lower latitude)	Y (for lower latitude)
0– 1	110, 498. 2	110, 515. 2	111, 321. 3	0. 0	110, 565. 9	222, 642. 6	0. 0	110, 650. 5	333, 963. 9	0. 0
1– 2	110, 498. 9	110, 515. 8	111, 253. 9	16. 9	110, 566. 6	222, 507. 9	67. 6	110, 651. 2	333, 761. 7	152. 1
2– 3	110, 500. 3	110, 517. 2	111, 186. 6	33. 8	110, 568. 0	222, 373. 1	135. 2	110, 652. 6	333, 559. 5	304. 2
3– 4	110, 502. 3	110, 519. 3	111, 119. 3	50. 7	110, 570. 0	222, 238. 4	202. 8	110, 654. 6	333, 357. 3	456. 3
(0– 4)	441, 999. 7	442, 067. 5			442, 270. 5			442, 608. 9		
4– 5	110, 505. 7	110, 522. 5	111, 051. 9	67. 6	110, 572. 8	222, 103. 7	270. 4	110, 656. 5	333, 155. 1	608. 4
5– 6	110, 509. 1	110, 525. 9	110, 850. 2	84. 2	110, 576. 2	221, 700. 1	336. 7	110, 660. 0	332, 549. 5	757. 6
6– 7	110, 513. 2	110, 530. 0	110, 648. 5	100. 7	110, 580. 2	221, 296. 6	403. 0	110, 664. 0	331, 943. 9	906. 7
7– 8	110, 518. 0	110, 534. 7	110, 446. 8	117. 3	110, 585. 0	220, 893. 0	469. 3	110, 668. 8	331, 338. 2	1, 055. 9
(4– 8)	442, 046. 0	442, 113. 1			442, 314. 2			442, 649. 3		
8– 9	110, 524. 4	110, 540. 9	110, 245. 1	133. 9	110, 590. 4	220, 489. 5	535. 6	110, 672. 9	330, 732. 6	1, 205. 0
9–10	110, 530. 4	110, 546. 9	109, 909. 9	149. 8	110, 596. 4	219, 819. 0	599. 3	110, 678. 9	329, 726. 4	1, 348. 4
10–11	110, 537. 2	110, 553. 7	109, 574. 8	165. 7	110, 603. 2	219, 148. 5	663. 0	110, 685. 7	328, 720. 1	1, 491. 7
11–12	110, 544. 6	110, 561. 1	109, 239. 6	181. 7	110, 610. 6	218, 477. 9	726. 7	110, 693. 1	327, 713. 8	1, 635. 0
(8–12)	442, 136. 6	442, 202. 6			442, 400. 6			442, 730. 6		
12–13	110, 554. 8	110, 570. 7	108, 904. 4	197. 6	110, 618. 6	217, 807. 3	790. 4	110, 698. 3	326, 707. 4	1, 778. 3
13–14	110, 563. 4	110, 579. 3	108, 437. 4	212. 6	110, 627. 2	216, 873. 0	850. 2	110, 707. 0	325, 305. 3	1, 913. 0
14–15	110, 572. 6	110, 588. 6	107, 970. 3	227. 5	110, 636. 4	215, 968. 7	910. 1	110, 716. 2	323, 903. 1	2, 047. 7
15–16	110, 582. 4	110, 598. 4	107, 503. 2	242. 5	110, 646. 2	215, 034. 2	970. 0	110, 726. 0	322, 500. 8	2, 182. 4
(12–16)	442, 273. 2	442, 337. 0			442, 528. 4			442, 847. 5		
16–17	110, 595. 4	110, 610. 7	107, 036. 1	257. 5	110, 656. 7	214, 069. 7	1, 029. 8	110, 733. 3	321, 098. 3	2, 317. 1
17–18	110, 606. 4	110, 621. 7	106, 439. 3	271. 2	110, 667. 7	212, 875. 9	1, 084. 7	110, 744. 3	319, 306. 8	2, 440. 6
18–19	110, 617. 9	110, 633. 3	105, 842. 5	284. 9	110, 679. 2	211, 681. 9	1, 139. 6	110, 755. 9	317, 515. 2	2, 564. 1
19–20	110, 630. 0	110, 645. 4	105, 245. 7	298. 6	110, 691. 4	210, 487. 9	1, 194. 5	110, 768. 0	315, 723. 3	2, 687. 5
(16–20)	442, 449. 7	442, 511. 1			442, 695. 0			443, 001. 5		
20–21	110, 645. 7	110, 660. 3	104, 648. 7	312. 3	110, 704. 0	209, 293. 7	1, 249. 4	110, 776. 9	313, 931. 2	2, 811. 0
21–22	110, 658. 8	110, 673. 4	103, 925. 0	324. 5	110, 717. 2	207, 845. 9	1, 298. 2	110, 790. 1	311, 758. 7	2, 920. 9
22–23	110, 672. 5	110, 687. 1	103, 201. 2	336. 8	110, 730. 8	206, 398. 0	1, 347. 0	110, 803. 8	309, 585. 9	3, 030. 7
23–24	110, 686. 7	110, 701. 3	102, 477. 3	349. 0	110, 745. 0	204, 949. 9	1, 395. 8	110, 817. 9	307, 412. 8	3, 140. 6
(20–24)	442, 663. 7	442, 722. 1			442, 897. 0			443, 188. 7		
24–25	110, 704. 9	110, 718. 6	101, 753. 3	361. 2	110, 759. 7	203, 501. 6	1, 444. 7	110, 828. 1	305, 239. 5	3, 250. 4
25–26	110, 720. 0	110, 733. 7	100, 906. 0	371. 6	110, 774. 8	201, 806. 5	1, 486. 5	110, 843. 2	302, 696. 1	3, 344. 5
26–27	110, 735. 5	110, 749. 2	100, 058. 6	382. 1	110, 790. 3	200, 111. 3	1, 528. 3	110, 858. 8	300, 152. 3	3, 438. 5
27–28	110, 751. 4	110, 765. 1	99, 211. 0	392. 5	110, 806. 2	198, 415. 8	1, 570. 1	110, 874. 7	297, 608. 2	3, 532. 6
(24–28)	442, 911. 8	442, 966. 6			443, 131. 0			443, 404. 8		
28–29	110, 771. 7	110, 784. 4	98, 363. 4	403. 0	110, 822. 6	196, 720. 1	1, 611. 9	110, 886. 2	295, 063. 7	3, 626. 7
29–30	110, 788. 4	110, 801. 1	97, 396. 4	411. 5	110, 839. 3	194, 785. 8	1, 645. 9	110, 902. 9	292, 161. 2	3, 703. 2
30–31	110, 805. 5	110, 818. 2	96, 429. 2	420. 0	110, 856. 4	192, 851. 2	1, 679. 9	110, 920. 0	289, 258. 4	3, 779. 7
31–32	110, 822. 9	110, 835. 6	95, 462. 0	428. 5	110, 873. 8	190, 916. 2	1, 713. 9	110, 937. 4	286, 355. 1	3, 856. 1
(28–32)	443, 188. 5	443, 239. 3			443, 392. 1			443, 646. 5		
32–33	110, 844. 9	110, 856. 6	94, 494. 5	437. 0	110, 891. 5	188, 981. 0	1, 747. 9	110, 949. 8	283, 451. 3	3, 932. 6
33–34	110, 862. 9	110, 874. 6	93, 412. 4	443. 4	110, 909. 6	186, 816. 4	1, 773. 4	110, 967. 9	280, 203. 5	3, 990. 0
34–35	110, 881. 2	110, 892. 9	92, 330. 1	449. 7	110, 927. 9	184, 651. 5	1, 798. 9	110, 986. 2	276, 955. 3	4, 047. 4
35–36	110, 899. 8	110, 911. 5	91, 247. 7	456. 1	110, 946. 4	182, 486. 2	1, 824. 4	111, 004. 8	273, 706. 4	4, 104. 8
(32–36)	443, 488. 8	443, 535. 6			443, 675. 4			443, 908. 7		
36–37	110, 923. 1	110, 933. 6	90, 165. 0	462. 5	110, 965. 2	180, 320. 5	1, 849. 9	111, 017. 9	270, 457. 0	4, 162. 2
37–38	110, 942. 1	110, 952. 6	88, 972. 8	466. 6	110, 984. 2	177, 935. 8	1, 866. 4	111, 036. 9	266, 879. 3	4, 199. 3
38–39	110, 961. 3	110, 971. 8	87, 780. 4	470. 8	111, 003. 4	175, 550. 8	1, 883. 0	111, 056. 1	263, 300. 9	4, 236. 5
39–40	110, 980. 6	110, 991. 1	86, 587. 9	474. 9	111, 022. 8	173, 165. 3	1, 899. 5	111, 075. 4	259, 721. 9	4, 273. 6
(36–40)	443, 807. 1	443, 849. 1			443, 975. 6			444, 186. 3		
40–41	111, 004. 7	111, 014. 1	85, 395. 1	479. 0	111, 042. 2	170, 779. 4	1, 916. 0	111, 089. 1	256, 142. 2	4, 310. 8
41–42	111, 024. 3	111, 033. 7	84, 098. 5	480. 8	111, 061. 8	168, 186. 0	1, 923. 2	111, 108. 7	252, 251. 4	4, 327. 0
42–43	111, 044. 0	111, 053. 4	82, 801. 7	482. 6	111, 081. 5	165, 592. 0	1, 930. 4	111, 128. 4	248, 359. 9	4, 343. 2
43–44	111, 063. 8	111, 073. 1	81, 504. 6	484. 4	111, 101. 3	162, 997. 7	1, 937. 6	111, 148. 2	244, 467. 7	4, 359. 4
(40–44)	444, 136. 8	444, 174. 3			444, 286. 8			444, 474. 4		
44–45	111, 088. 3	111, 096. 5	80, 207. 3	486. 2	111, 121. 1	160, 402. 8	1, 944. 8	111, 162. 0	240, 574. 8	4, 375. 6
45–46	111, 108. 1	111, 116. 3	78, 812. 5	485. 7	111, 140. 9	157, 612. 9	1, 942. 6	111, 181. 8	236, 389. 4	4, 370. 5
46–47	111, 127. 9	111, 136. 1	77, 417. 3	485. 1	111, 160. 7	154, 822. 5	1, 940. 3	111, 201. 6	232, 203. 3	4, 365. 4
47–48	111, 147. 7	111, 155. 9	76, 022. 0	484. 5	111, 180. 4	152, 031. 6	1, 938. 1	111, 221. 4	228, 016. 5	4, 360. 3
(44–48)	444, 472. 0	444, 504. 8			444, 603. 1			444, 766. 8		

TABLE 5.—*Coordinates of intersections of meridians and parallels and lengths of meridians for each degree of latitude, in meters*—Con.

Latitude (°)	Length of central meridian	Meridian 1° from central meridian			Meridian 2° from central meridian			Meridian 3° from central meridian		
		Length of meridian	X (for lower latitude)	Y (for lower latitude)	Length of meridian	X (for lower latitude)	Y (for lower latitude)	Length of meridian	X (for lower latitude)	Y (for lower latitude)
48–49	111, 172. 1	111, 179. 1	74, 626. 4	484. 0	111, 200. 2	149, 240. 2	1, 935. 8	111, 235. 3	223, 828. 9	4, 355. 2
49–50	111, 191. 7	111, 198. 8	73, 139. 9	481. 1	111, 219. 8	146, 267. 1	1, 924. 1	111, 254. 9	219, 369. 1	4, 329. 0
50–51	111, 211. 3	111, 218. 3	71, 653. 2	478. 1	111, 239. 4	143, 293. 6	1, 912. 4	111, 274. 4	214, 908. 4	4, 302. 7
51–52	111, 230. 7	111, 237. 7	70, 166. 2	475. 2	111, 258. 8	140, 319. 5	1, 900. 8	111, 293. 9	210, 447. 0	4, 276. 4
(48–52)	444, 805. 8	444, 833. 9	----------	----------	444, 918. 2	----------	----------	445, 058. 5	----------	----------
52–53	111, 254. 5	111, 260. 4	68, 678. 9	472. 3	111, 278. 0	137, 344. 9	1, 889. 1	111, 307. 4	205, 984. 8	4, 250. 1
53–54	111, 273. 6	111, 279. 5	67, 108. 0	467. 1	111, 297. 1	134, 203. 0	1, 868. 2	111, 326. 5	201, 272. 0	4, 203. 1
54–55	111, 292. 5	111, 298. 4	65, 536. 8	461. 9	111, 316. 0	131, 060. 6	1, 847. 3	111, 345. 4	196, 558. 3	4, 156. 1
55–56	111, 311. 2	111, 317. 0	63, 965. 3	456. 6	111, 334. 7	127, 917. 6	1, 826. 4	111, 364. 0	191, 843. 8	4, 109. 1
(52–56)	445, 131. 8	445, 155. 3	----------	----------	445, 225. 8	----------	----------	445, 343. 3	----------	----------
56–57	111, 334. 0	111, 338. 8	62, 393. 6	451. 4	111, 353. 1	124, 774. 1	1, 805. 5	111, 377. 0	187, 128. 5	4, 062. 1
57–58	111, 352. 2	111, 356. 9	60, 745. 8	444. 0	111, 371. 3	121, 478. 6	1, 775. 9	111, 395. 1	182, 185. 4	3, 995. 3
58–59	111, 370. 0	111, 374. 8	59, 097. 7	436. 6	111, 389. 1	118, 182. 5	1, 746. 2	111, 413. 0	177, 241. 4	3, 928. 5
59–60	111, 387. 6	111, 392. 4	57, 449. 3	429. 1	111, 406. 7	114, 885. 8	1, 716. 5	111, 430. 6	172, 296. 7	3, 861. 7
(56–60)	445, 443. 8	445, 462. 9	----------	----------	445, 520. 2	----------	----------	445, 615. 7	----------	----------
60	----------	----------	55, 800. 7	421. 7	----------	111, 588. 7	1, 686. 8	----------	167, 351. 2	3, 794. 9

TABLE 6.—*Coordinates of intersections of meridians and parallels and lengths of meridians for each degree of latitude, in inches*

[For modified polyconic projection of map of the world, scale 1:1,000,000]

Latitude (°)	Length of central meridian	Meridian 1° from central meridian			Meridian 2° from central meridian			Meridian 3° from central meridian		
		Length of meridian	X (for lower latitude)	Y (for lower latitude)	Length of meridian	X (for lower latitude)	Y (for lower latitude)	Length of meridian	X (for lower latitude)	Y (for lower latitude)
0–1	4.350	4.351	4.383	0.000	4.353	8.765	0.000	4.356	13.148	0.000
1–2	4.350	4.351	4.380	.001	4.353	8.760	.003	4.356	13.140	.006
2–3	4.350	4.351	4.377	.001	4.353	8.755	.005	4.356	13.132	.012
3–4	4.350	4.351	4.375	.002	4.353	8.750	.008	4.356	13.124	.018
(0–4)	17.400	17.404			17.412			17.424		
4–5	4.351	5.351	4.372	.003	4.353	8.744	.011	4.357	13.116	.024
5–6	4.351	4.351	4.364	.003	4.353	8.728	.013	4.357	13.092	.030
6–7	4.351	4.352	4.356	.004	4.354	8.712	.016	4.357	13.069	.036
7–8	4.351	4.352	4.348	.005	4.354	8.697	.018	4.357	13.045	.042
(4–8)	17.404	17.406			17.414			17.428		
8–9	4.351	4.352	4.340	.005	4.354	8.681	.021	4.357	13.021	.047
9–10	4.352	4.352	4.327	.006	4.354	8.654	.024	4.357	12.981	.053
10–11	4.352	4.353	4.314	.007	4.354	8.628	.026	4.358	12.942	.059
11–12	4.352	4.353	4.301	.007	4.355	8.601	.029	4.358	12.902	.064
(8–12)	17.407	17.410			17.417			17.430		
12–13	4.353	4.353	4.288	.008	4.355	8.575	.031	4.358	12.862	.070
13–14	4.353	4.354	4.269	.008	4.355	8.538	.033	4.359	12.807	.075
14–15	4.353	4.354	4.251	.009	4.356	8.503	.036	4.359	12.752	.081
15–16	4.354	4.354	4.232	.010	4.356	8.466	.038	4.359	12.697	.086
(12–16)	17.413	17.415			17.422			17.435		
16–17	4.354	4.355	4.214	.010	4.357	8.428	.041	4.360	12.642	.091
17–18	4.355	4.355	4.191	.011	4.357	8.381	.043	4.360	12.571	.096
18–19	4.355	4.356	4.167	.011	4–357	8.334	.045	4.360	12.501	.101
19–20	4.356	4.356	4.144	.012	4.358	8.287	.047	4.361	12.430	.106
(16–20)	17.420	17.422			17.429			17.441		
20–21	4.356	4.357	4.120	.012	4.358	8.240	.049	4.361	12.359	.111
21–22	4.357	4.357	4.092	.013	4.359	8.183	.051	4.362	12.274	.115
22–23	4.357	4.358	4.063	.013	4.359	8.126	.053	4.362	12.188	.119
23–24	4.358	4.358	4.035	.014	4.360	8.069	.055	4.363	12.103	.124
(20–24)	17.428	17.430			17.436			17.448		
24–25	4.358	4.359	4.006	.014	4.361	8.012	.057	4.363	12.017	.128
25–26	4.359	4.360	3.973	.015	4.361	7.945	.059	4.364	11.917	.132
26–27	4.360	4.360	3.939	.015	4.362	7.878	.060	4.365	11.817	.135
27–28	4.360	4.361	3.906	.015	4.362	7.812	.062	4.365	11.717	.139
(24–28)	17.437	17.440			17.446			17.457		
28–29	4.361	4.362	3.873	.016	4.363	7.745	.063	4.366	11.617	.143
29–30	4.362	4.362	3.834	.016	4.364	7.669	.065	4.366	11.502	.146
30–31	4.362	4.363	3.796	.017	4.364	7.593	.066	4.367	11.388	.149
31–32	4.363	4.364	3.758	.017	4.365	7.516	.067	4.368	11.274	.152
(28–32)	17.448	17.451			17.456			17.467		
32–33	4.364	4.364	3.720	.017	4.366	7.440	.069	4.368	11.159	.155
33–34	4.365	4.365	3.678	.017	4.367	7.355	.070	4.369	11.032	.157
34–35	4.365	4.366	3.635	.018	4.367	7.270	.071	4.370	10.904	.159
35–36	4.366	4.367	3.592	.018	4.368	7.184	.072	4.370	10.776	.162
(32–36)	17.460	17.462			17.468			17.477		
36–37	4.367	4.367	3.550	.018	4.369	7.099	.073	4.371	10.648	.164
37–38	4.368	4.368	3.503	.018	4.369	7.005	.073	4.372	10.507	.165
38–39	4.369	4.369	3.456	.019	4.370	6.911	.074	4.372	10.366	.167
39–40	4.369	4.370	3.409	.019	4.371	6.818	.075	4.373	10.225	.168
(36–40)	17.473	17.474			17.479			17.488		

TABLE 6.—*Coordinates of intersections of meridians and parallels and lengths of meridians for each degree of latitude, in inches*—Continued

Latitude (°)	Length of central meridian	Meridian 1° from central meridian			Meridian 2° from central meridian			Meridian 3° from central meridian		
		Length of meridian	X (for lower latitude)	Y (for lower latitude)	Length of meridian	X (for lower latitude)	Y (for lower latitude)	Length of meridian	X (for lower latitude)	Y (for lower latitude)
40–41	4.370	4.371	3.362	0.019	4.372	6.724	0.075	4.374	10.084	0.170
41–42	4.371	4.371	3.311	.019	4.373	6.621	.076	4.374	9.931	.170
42–43	4.372	4.372	3.260	.019	4.373	6.519	.076	4.375	9.778	.171
43–44	4.373	4.373	3.209	.019	4.374	6.417	.076	4.376	9.625	.172
(40–44)	17.486	17.487			17.492			17.499		
44–45	4.374	4.374	3.158	.019	4.375	6.315	.077	4.376	9.471	.172
45–46	4.374	4.375	3.103	.019	4.376	6.205	.076	4.377	9.307	.172
46–47	4.375	4.375	3.048	.019	4.376	6.095	.076	4.378	9.142	.172
47–48	4.376	4.376	2.993	.019	4.377	5.985	.076	4.379	8.977	.172
(44–48)	17.499	17.500			17.504			17.510		
48–49	4.377	4.377	2.938	.019	4.378	5.876	.076	4.379	8.812	.171
49–50	4.378	4.378	2.880	.019	4.379	5.759	.076	4.380	8.637	.170
50–51	4.378	4.379	2.821	.019	4.379	5.641	.075	4.381	8.461	.169
51–52	4.379	4.379	2.762	.019	4.380	5.524	.075	4.382	8.285	.168
(48–52)	17.512	17.513			17.516			17.522		
52–53	4.380	4.380	2.704	.019	4.381	5.407	.074	4.382	8.110	.167
53–54	4.381	4.381	2.642	.018	4.382	5.284	.074	4.383	7.924	.165
54–55	4.382	4.382	2.580	.018	4.383	5.160	.073	4.384	7.738	.164
55–56	4.382	4.383	2.518	.018	4.383	5.036	.072	4.384	7.553	.162
(52–56)	17.525	17.526			17.529			17.533		
56–57	4.383	4.383	2.456	.018	4.384	4.912	.071	4.385	7.367	.160
57–58	4.384	4.384	2.392	.017	4.385	4.783	.070	4.386	7.173	.157
58–59	4.385	4.385	2.327	.017	4.385	4.653	.069	4.386	6.978	.155
59–60	4.385	4.386	2.262	.017	4.386	4.523	.068	4.387	6.783	.152
(56–60)	17.537	17.538			17.540			17.544		
60			2.197	.017		4.393	.066		6.589	.149

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